Using first-hand insights in strategic decision-making about IT

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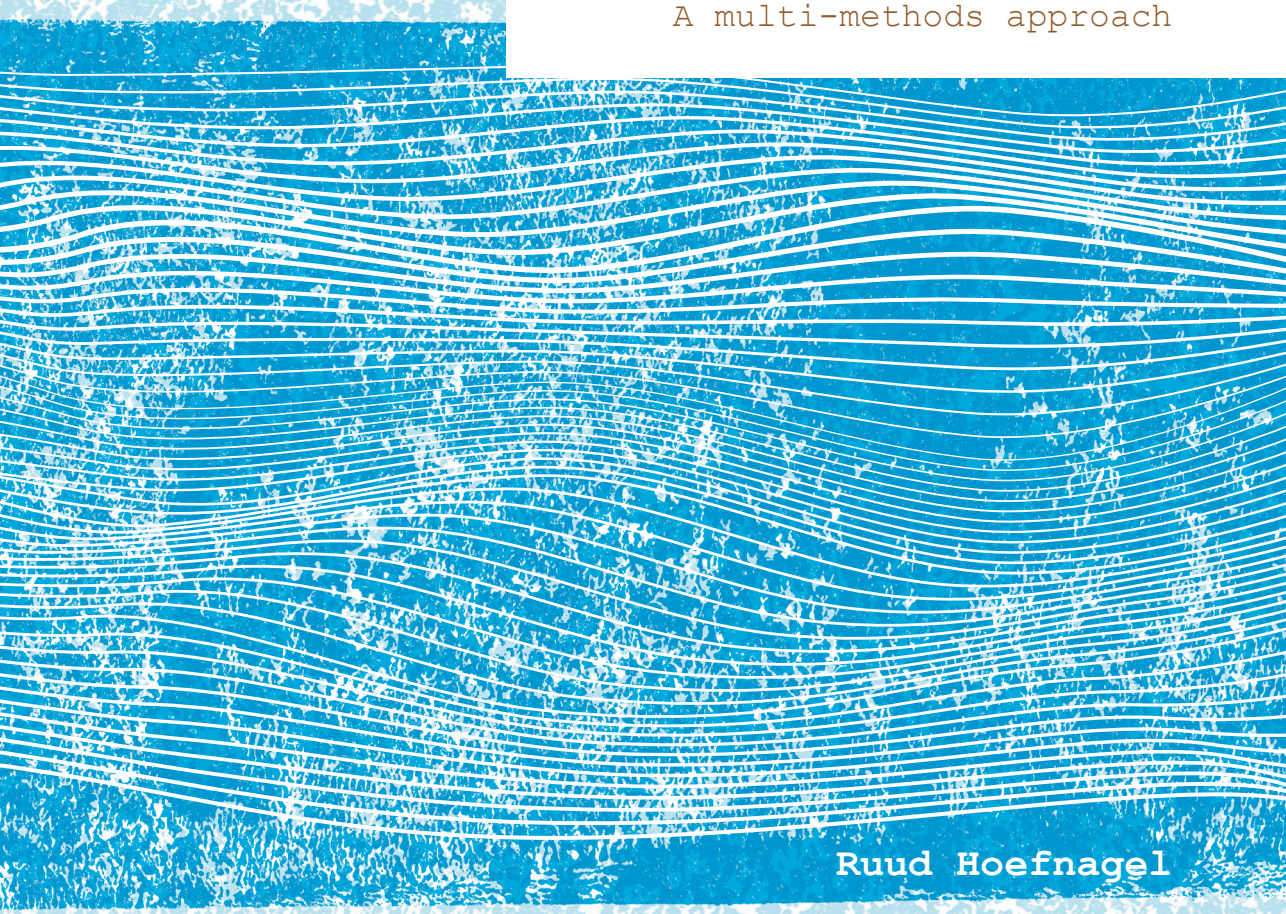

Ruud Hoefnagel

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A multi-method approach

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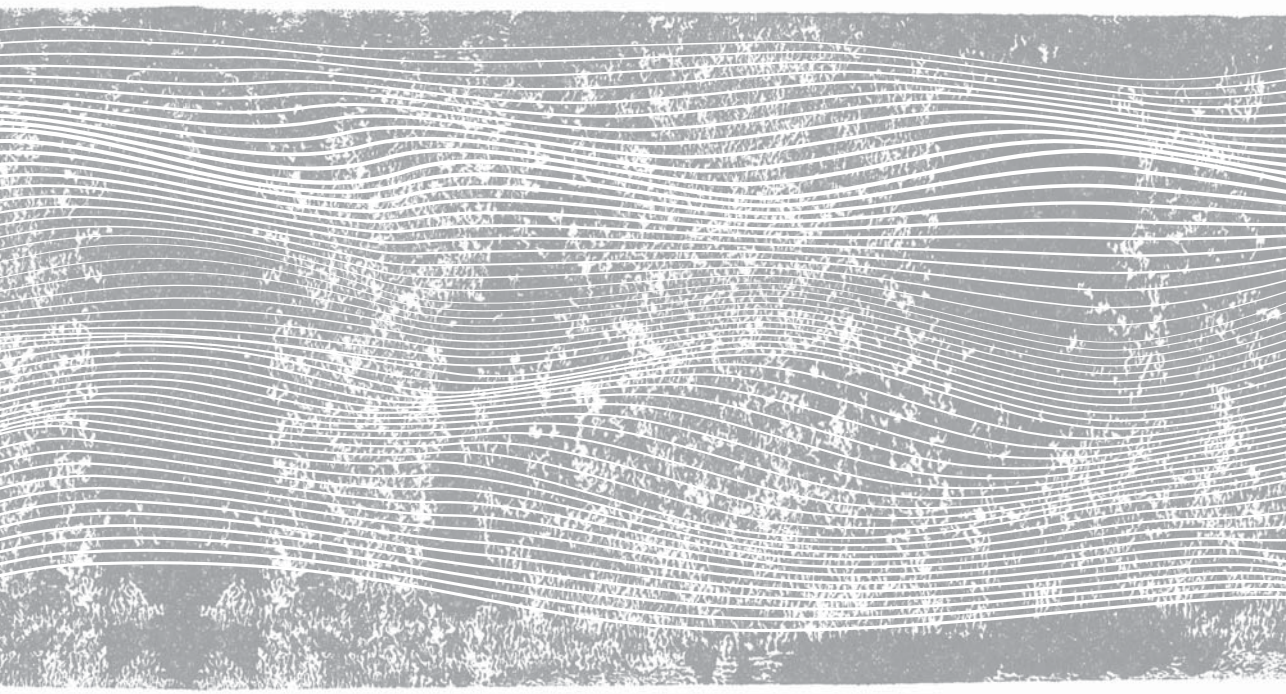

1. INTRODUCTION

1.1 The usefulness of first-hand insights in strategic decision-making about IT

First-hand insights[1] from end-users of information technology (IT) are nowadays regarded as a key strategic asset for organizations (Walsh, 2014), because IT decision-making only matters when the technological potential becomes embedded in organizational practices (Arvidsson, Holmström, & Lyytinen, 2014). However, in practice, the incorporation of first-hand insights into strategic decision-making about IT can be a goal that is hard to reach, as reports demonstrate for the Dutch police service (Stuiveling & Schoten van, 2011), and for other Dutch public organizations in general (Elias, Ulenbelt, Fokke, Bruins Slot, & Meenen van, 2014). Aimed at improving the current status quo in incorporating first-hand insights into Dutch Police service's strategic decision-making (SDM) practices, and Dutch public organizations in general, this dissertation revolves around how to convey first-hand insights about IT to strategic decision-makers.

SDM can benefit from first-hand insights because they add concrete and specific information to abstract informational inputs, such as prospective estimations about costs, benefits and risks which are typically used as informational inputs for SDM. Adding first-hand insights complements SDM's more typical informational inputs in several ways. To start with, first-hand insights provide concrete information about the actual impact of an IT, not merely derived from estimations or deduced from use in other organizations, but in the IT's actual use context. Direct observations of impact and use thus complement the more prospective informational inputs and make these prospective informational inputs about costs, benefits and risks more reliable. Also, tapping into this source of direct experience enables insight into key implementation considerations before SDM about IT has occurred and thus before scarce public resources have been allocated and spent (Elias et al., 2014). One such key implementation consideration may include the IT's value for its intended end-users (Elias et al., 2014). Last, but not least, incorporating first-hand insights into SDM also provides the people affected by the decision to express their voice in the SDM process, which is highly regarded in the emancipated Dutch society.

The incorporation of first-hand insights into SDM at the Dutch police service is now more relevant than ever, because of scale enlargement. From the beginning of 2013 one national organization substitutes 26 regional police forces.[2] The strategic decision makers' span of control has since that moment found substantial enlargement to a police service encompassing around 63,000 police officers, a Euro 5 billion annual budget, servicing around 16.9 million Dutch citizens and

1 The insights that citizens and police officers gain from direct experience with information technology.
2 Source: http://wetten.overheid.nl/BWBR0031788.

seasonally large groups of tourists (Police, 2015). This scale enlargement opens up renewed possibilities to fight crime and economize on resources. Yet, strategic decision-makers do not have direct access to first-hand insights. At present, the strategic decision-makers of the Dutch police reside in an office solely dedicated to policy and policy development, physically and potentially mentally apart from the Dutch Police service's operational operations. As a consequence, first-hand insights from police officers and citizens to decision-makers are not directly available, while its value for SDM practices remains either unchanged, or has even become more important in the light of emancipated citizens and police officers. Therefore, incorporating first-hand insights into the SDM process about IT development should form one of the Dutch police service's key development tasks to improve its IT ecology (Stuiveling & Schoten van, 2011), as it has been concluded for Dutch government institutions in general (Elias et al., 2014).

In 2007, when I started working as a policy advisor and researcher concerned with Dutch police service's IT I observed that there was little experience at the Dutch police as to how to incorporate first-hand insights about IT into SDM. Methods and techniques to explore first-hand insights were undeveloped, and also the strategic decision-maker's informational preferences were unclear. This practical knowledge gap attracted my interest and attention because it both encompassed a major analytical challenge, and it was of direct practical value for the many citizens, police officers and strategic decision-makers involved. From a theoretical perspective I found that informational inputs, such as first-hand insights, are thought to be one of the central elements in SDM (Narayanan, Zane, & Kemmerer, 2011). Diving into theory about the strategic decision-maker's mind, i.e. strategic cognition research, however I found there is much that we do not know about the way in which qualitatively different informational inputs are processed by strategic decision-makers (Basel & Bruhl, 2013), as will be pointed out with more detail in the following sections of this introductory chapter.

So, this dissertation is aimed to fill practical and theoretical knowledge gaps shortly outlined above pertaining the usefulness of first-hand insight in strategic decision-making about IT. The practical aim of this dissertation is to aid the Dutch police service in incorporating first-hand insight into its strategic decision-making about IT which is one of its major IT development tasks (Stuiveling & Schoten van, 2011). Focusing on IT end-users' assessment as information inputs for SDM at the Dutch police service, in turn contributes to what is called the micro foundations movement[3] in

3 This micro-foundations movement is designed to (Felin et al., 2015:1): '*unpack collective concepts to understand how individual-level factors impact organizations, how the impact of individuals leads to emergent collective and organizational level outcomes and performance, and how relations between macro variables are mediated by micro actions and interactions*'. This movement complements the standing body of strategy and organization theory in several ways. First it brings in a (renewed) sensitivity that (individuals situated in) multiple organizational levels are intimately linked in analysing the phenomena of interest in strategy and organization theory. Secondly, the micro foundations movement provides a call for bringing the people back into strategic and organizational analysis.

strategy and organization theory (Felin, Foss, & Ployhart, 2015). In this dissertation it is explored how the perspectives of police officers and citizens can be incorporated into SDM and how their perspectives can be used to persuade strategic decision-makers in sensing organizational opportunities (Basel & Bruhl, 2013; Teece, 2007).

In the next section the research context is introduced with a dual aim: to position the research and research question in its empirical setting and to show in more detail that the study of end-user assessments, a topic of interest in its own right, is used instrumentally in this dissertation for the analysis of information processing in SDM. From this point the state of the art of theoretical knowledge regarding the empirical knowledge gaps are shortly outlined in two separate subsections. Each subsection ends with the statement of a research sub-question this dissertation seeks to answer. Next, this dissertation's approach to study both research sub-questions is explicated, and finally this dissertation's outline is presented.

1.2 Research context: strategic decision-making about IT at the Dutch police service

In this section, strategic decision-making about IT at the Dutch police service is introduced as the research context. In order to do so, the Dutch police service, its organizational structure and function in society are described in general terms. Subsequently, the incorporation of first-hand insights in strategic decision-making processes about Dutch police service's IT is presented as a key theme in Dutch police service's IT strategic decision-making. This section ends with a conclusion and a statement of practical research objectives this study seeks to attain.

1.2.1 The Dutch police service

The Dutch police service patrols the streets, investigates crime and assists the public in many ways, from first aid for the injured and assistance for the mentally confused to support for the victims of domestic violence. Their tasks and legislative framework are laid down in the Police Act 2012 (Ministry for Interior and Kingdom Relations, 2012). The Ministry of Security and Justice is responsible for maintaining the rule of law in the Netherlands, hence, also for the Dutch police service. As of 2013 a new national police organization of the Netherlands is installed replacing 26 independent, regionally oriented, police services. This substitution is designed to support strong cooperation within one police organization, on a local, regional and national level. The police service's strategic management supported by its staff and supervised by staff directors all act at the national level. The same is the case for a unit for specialist police activities and a police service center for all business operations. The regional units make up the police service at a regional level, headed by unit chiefs. Together with the strategic management

team and the staff directors, these unit chiefs form the group of strategic decision-makers of the Dutch police service. Within these regional units a further division into districts brings us to the organization of the Dutch police service at a local level. Each local level consists of an all-round base team, district detectives and a flex team. In sum, the Dutch police service comprises approximately 63,000 employees of whom 50,000 FTE executive police officers involved in public order and criminal investigations tasks, and 13,000 FTE supporting staff mostly organized in one police service center. Approximately 2,300 FTE of supporting staff are involved in the development of ICT (Police, 2013), and the 2015 budget for Dutch police service's IT is EURO 350 million (Police, 2015).

1.2.2 IT decision-making & the incorporation of first-hand insights

For the proper functioning of a reorganized police service, IT and standardization of IT are regarded as important levers for the police service to coordinate police work simultaneously on a local, regional as well as a national level. The main expected advantage for the police to reorganize its IT on a national level, as opposed to in 26 separately organized units prior to 2013, is that it should enable easier information sharing while saving on resources. To do so, structural changes have been made in the decision-making on and development of the Dutch police service's IT. Since 2012, Dutch police service's IT decision-making and development are organized by the interdependent functioning of three organizational units. One unit, IT policy management (50 FTE), is positioned in the strategic management staff. Information Management (650 FTE) and IT (1,600 FTE), both executing services, are located in the Dutch police's service center. On top of this, a Chief Information Officer (CIO), one of the five police service's strategic management team, was installed to orchestrate these three functions.

To enhance standardization of the many IT components and policing processes at a national level, all these interdependent choices are coordinated in a 374 million Euro program, the *Aanvalsprogramma Informatievoorziening Politie* (AIP). AIP was launched at the end of 2011, the program's 160 highly interdependent projects must find execution in the period 2012-2017 (Police, 2014). The AIP is aimed at improving *ease of use* and *usefulness* of IT for police officers. One might ask, why are *ease of use* and *usefulness* chosen as the key-criteria in the program's overall goal? Well, in part the AIP was installed as a response to a comprehensive governmental evaluation. In 2011, The Dutch Court of Audit[4] came to conclude that incorporating the first-hand insights from police officers was much needed for increasing Dutch police service's

4 The Court of Audit checks that the government spends public funds and conducts policy as intended. The Court of Audit audits whether central government revenue and expenditure are received and spent correctly and whether central government policy is implemented as intended. As a high council of state it acts independent of the government. (Source: http://www.courtofaudit.nl/english/Organisation).

IT's more useful and easy to use and for restoring confidence. The Dutch court of audit even stated that (Stuiveling & Schoten van, 2011:13):

> *"The distance between IT decision makers and the shop floor was too great. In consequence, police officers were overlooked and lost confidence in IT."*

Let us take a closer look at why the Dutch Court of Audit came to their conclusions. The joint development of the police service's IT had been going on prior to the installation of the police act of 2013. Already, before this legal framework was installed, the regional police services coordinated their IT related activities to benefit from their joint capacity. Although the joint development of IT has a long history from 2007 onwards, all of (then still) the regional forces acknowledge that Dutch police service's major IT development tasks are to come to (a more) unified set of Information & Communication Technologies to increase the police service's productivity (Stuiveling & Schoten van, 2011). In the 2007-2010 period, the regional police services therefore joined their efforts to introduce a set of key policing information systems (IS), a specific type of information technology, supporting the standard facilities for enforcement (BVH), investigation (BVO) and capacity management (BVCM) on a national level. The policy document called "*wenkend perspectief*" guided the Dutch police service's quest to come to a more uniform IT infrastructure (Stuiveling & Schoten van, 2011). This document was written by representatives of the 26 regional police services to form and implement a joint IT development agenda. In 2010, after the nation-wide implementation of these three key Information Systems for the Dutch police service, the Dutch Court of Audit conducted an evaluation regarding the state of affairs in the police service's IT development in the foregoing years. The Dutch Court of Audit reported on their investigation in 2011 and concluded, that although investments in the police service's IT development were considerable, the successful introduction of information systems in the interdependent police services proved to be a goal hard to reach successfully. Analysing, among other sources, 69 empirical evaluations regarding the introduction of the police service's key information systems, one of the key themes the Dutch Court of Audit reports on is the insufficient degree to which the implemented information systems support police officers in their work. Both the usefulness and ease of use of the evaluated information systems was regarded as (too) low. As a consequence, police officers experienced much inefficiency in their work due to the mandated use of the police service's key information systems. Also, and probably consequentially, The Dutch Court of Audit reported that police officers tend to avoid the newly introduced IS as much as possible by using alternative strategies and technologies to get their jobs done. This is especially the case for detectives using the IS for investigative work (Police, 2006). This last observation directly obstructs Dutch police service's central development aim (at least since 2007): to come to a more uniform work practice and IT usage across all Dutch regional police services, enabling information sharing

across organizational units (Stuiveling & Schoten van, 2011). Considering this development aim The Dutch Court of Audit reported in their concluding remark that:

> *Reforming the police service from a regional into a national service could help improve control. However, it would not automatically resolve the problems. The organization and management of IT must be simplified and strengthened. The police services' procedures should be harmonized and administrative burdens should be reduced. The culture in the police service must also be reformed so that police officers come first and confidence is strengthened.* (Stuiveling & Schoten van, 2011:11)

In retrospect, the Dutch Court of Audit's evaluation turned out to be pivotal for the direction taken by the organization and management of IT development of the Dutch police. In response to the report the Dutch Minister of Security and Justice gave the assignment for execution of the AIP, and several structural changes have been made to simplify IT decision-making, as was advised by the Dutch Court of Audit. Installing a CIO in the police service's managing board was one such change. Meanwhile the formation of the national police, happening in the same time frame, enabled this substitution, as well as it demanded it. Still, besides these structural changes, at this point there were no practices to enhance IT decision-making with first-hand insights from the intended end-users of the police service's IT. At the same time, the scale enhancement detached the strategic decision-maker from its intended IT end-users, which even lowered the possible use of first-hand insights. In this study intended IT end-users refer to the 16 million citizens of the Netherlands,[5] and 63,000 police officers are another end-user population who are also eager to share their first-hand insights, as becomes apparent in the next chapters. This dissertation wishes to bring the first-hand insights (back) into today's strategic decision-making processes, which is of key interest for this scale enhanced police service (Stuiveling & Schoten van, 2011), as becomes once more apparent in the Dutch Court of audit's press publication released after their audit about the state of affairs about the IT of the Dutch police service (Box 1.1).

1.2.3 Conclusion: this dissertation's practical objective

While many efforts for improvement aim at *structural* improvements, such as installing a CIO, and reducing the amount of organizational functions involved in SDM, this dissertation wishes to complement these organizational changes by focussing on how to convey first-hand insights from citizens and police officers to strategic decision-makers of the Dutch police service. At the

5 For example through technology mediated, real-time, interaction such as through telephone or video signal, or by means of the police service's website and apps.

Box 1.1 Dutch court of audit English (original) news item [Source: http://www.courtofaudit.nl, date accessed: may 2015]

Put police officers at the center of ICT support

News item | 23-06-2011

Support for ICT among the police undermined by approach in recent years

The police service has made little progress finding permanent solutions to ICT problems in recent years. The information systems in place for police officers and detectives, such as the standard facilities for enforcement (BVH) and investigation (BVO) provide inadequate support for police work. The BVH and BVO are not future proof, have poor user interfaces and have not been introduced uniformly. Regional police force managers have too little grip on ICT. The heads of police forces stuck to their own regional procedures and the minister's supervision was inadequate. The distance between ICT decision-makers and the shop floor was too great. In consequence, police officers have been overlooked and have lost confidence in ICT.

start of this dissertation project it is observed that there are hardly any practices, procedures and techniques to incorporate IT related first-hand insights from citizens and police officers into IT related strategic decision-making at the Dutch police service, whilst these first-hand insights are of key strategic importance (Elias et al., 2014; Stuiveling & Schoten van, 2011; Walsh, 2014). Therefore, this dissertation's practical objective is:

> *To provide recommendations to the Dutch police service about the use of citizens' and police officers' first-hand insights in strategic decision-making processes about information technology.*

The recommendations are deduced from explorations and applications of state of the art knowledge regarding end-user assessment of technology, and by empirically testing the informational preferences of Dutch police service's strategic decision-makers. The approaches selected will become clear in the next sections of this chapter.

1.3 Theoretical knowledge gaps

In the previous section, it was explained why first-hand insights of citizens and police officers, *as end-users assessing the police service's IT*, are used as the (social) informational inputs for the study of *information processing of strategic decision-makers*. Furthering these two interrelated areas of interest, the current section addresses the theoretical knowledge gaps this dissertation seeks to fill. In doing so, it also becomes clear that the *end-user assessment of technology* is, besides being instrumental for the study of *information processing of strategic decision-makers*, an exciting research tradition in its own right. Let us start with stating the research problem pertaining information processing of strategic decision-makers, this dissertation's main theoretical theme.

1.3.1 Information processing of strategic decision makers

This section presents this dissertation's central research question by pointing out briefly the current state of the art knowledge and by elucidating the persisting knowledge gaps in current theorizing about strategic decision-makers' information processing. To this end, the two related fields of strategic cognition and human information processing research are used. Reviewing the current state of affairs in strategic cognition (SC) makes us especially sensitive for the decision-maker's dealing with its own cognitive limitations when processing information. Whereas human information processing (HIP) research, provides us with in-depth understanding as to in what ways humans actually respond to differential framings of informational inputs, using dual process models (Chaiken, 1980; Petty & Cacioppo, 1979).

Information processing a strategic cognition perspective

Strategic decision-making (SDM) is defined here as '*the process by which a strategic decision is made and implemented and the factors which affect it*' (Elbanna, 2006:2). Relying on many scholars in the field (Walsh, 1995), Dean and Sharfman define strategic decisions as decisions '*committing substantial resources, setting precedents, and creating waves of lesser decisions; as ill-structured, non-routine and complex; and as substantial, unusual and all pervading*' (Dean & Sharfman, 1996:379-380). So, strategic decision-making regards a complex social practice, requiring many cognitive capabilities from individuals involved in this process. As a subfield of SDM literature, the study of strategic cognition (SC) is subjected to understanding the workings of individuals and groups in SDM practices. Various management disciplines, such as marketing, management control, organization- and information science direct their attention to establishing solid descriptive and prescriptive models with the aim to improve decision and avoid error (Bazerman & Moore, 2009). For comprehensive reviews of this field's scope, accomplishments and guiding research questions see Walsh (1995) and Narayanan et al. (2011).

SC research learns us that studies directed at a strategic decision-maker's information processing capabilities follow two models about an SDM's rationality (Basel & Bruhl, 2013). One model assuming humans to be completely rational and the other assuming bounded rationality (Gigerenzer & Selten, 2002). As is shown next, the unique characteristics of both models find their main application on different levels of analysis stemming from different theoretical backgrounds.

Unbounded rationality has been posed by its proponents to be typically useful on a macro (firm/industry) level (Hodgkinson & Starbuck, 2008). It developed out of classical economic theories whereas bounded rationality's intellectual roots are in sociology and psychology. Unbounded rationality posits (economic) decision-making as fully rational and self-interested: the human being as homo economicus (Persky, 1995). This prototypical actor acts along 5 Axioms of unbounded rationality (Fishburn, 1981):

- When confronted with multiple options, homo economicus is able to deploy an ordering of preference (order of preference).
- If one option is preferred over others he/she chooses this option (choice of preference).
- No inconsistencies occur (transitivity of preference).
- Preferences of homo economicus are independent from other considerations (independence of preferences).
- Preferences of homo economicus are of no subject to change (invariance of preferences).

This normative model's theoretical focus mainly serves to predict future (macro) behaviors of firms and industries and generally over a long(er) time span (Alchian, 1950; Machlup, 1946). Which is opposed to actual (micro) behavior of individual decision-makers in the short-run, such as is the case when processing information in a specific strategic decision-making situation (Hodgkinson & Starbuck, 2008), the level of analysis and – observation in this dissertation.

Bounded rationality, a term first coined by Simon (Hodgkinson & Starbuck, 2008; Simon, 1947), takes a social actors' dealing with (cognitive) limitations as a theoretical starting point, and finds it's application predominantly on micro levels such as the study of individual and group decision-making (Hodgkinson & Starbuck, 2008). Limitations arise from three interrelated constraints pertaining the task (information needed for making an investment decision), environmental constraints (information costs, difficulty of gathering information), and one's cognitive capabilities (to process information) (Basel & Bruhl, 2013). Together, these

interrelated constraints limit a human's information processing capabilities (Simon & Newell, 1972). Consequently, it has been argued that strategic decision-makers develop heuristics to deal with their information processing limitations. Heuristics can be understood as cognitive shortcuts that emerge when information time and processing capacity are limited (Simon, 1957). Examples of everyday heuristic processing are applying a rule of thumb, the educated guess and stereotyping. According to Simon such processing of information enables satisficing. This means that a strategic decision-maker is bounded by the task at hand, one's cognitive – and environmental constraints a decision-maker can still attain a satisfactory outcome given specified levels of an individual's needs. Satisficing, as a coping strategy for bounded rationality, is related to general theory of second-best outcome (Lipsey & Lancaster, 1956), also opposing the ideal and necessity to attain a perfect outcome in SDM.

Bingham and Eisenhardt (2014) identified three currently active research programs studying SDM following-up on Simon's ground work on bounded rationality in SC research. Those are the heuristics-and-biases program (Tversky & Kahneman, 1974); the fast-and-frugal research program (Gigerenzer & Todd, 1999); and the simple rule program (Bingham & Eisenhardt, 2011). These three contrast and connect in several ways as is briefly reviewed below.

First, in the heuristics and biases program, heuristics are studied to evaluate the relationship between tasks and the cognitive capabilities of individuals, largely neglecting the environment in which decisions take place (Basel & Bruhl, 2013). Applying the stream of thought about heuristics in an SDM context, its proponents found evidence that although the use of universal cognitive shortcuts (heuristics) reduces the information processing requirements, the main concern in this program is that while heuristics might be useful sometimes, they might also lead to poor biased decision-making practices and errors (Bingham & Eisenhardt, 2014). Hence the heuristics–and-biases program stresses the negative impact heuristics can play in SDM processes (Gigerenzer & Gaissmaier, 2011).

Second, the fast and frugal conceptualization of heuristics accentuates the study of how heuristics suit the real-life environments of strategic decision-makers. In this view on heuristic decision-making, a strategic decision-maker uses this strategy to adaptively match the information structure with environmental demands, hence like Simon's *satisficing* approach this strategy can also be regarded as ecologically rational (Hodgkinson & Starbuck, 2008). As in the heuristics and biases program, heuristics are assumed to have universal value and are applied by strategic decision-makers to exploit their environment (Gigerenzer & Gaissmaier, 2011). The validity of heuristics and biases is tested over time in a given SDM practice (Vuori & Vuori, 2014). Following empirical research on fast and frugal heuristics, a heuristic not only reduces information-processing requirements, the quality of the SDM practices is also

positively impacted (Gigerenzer & Todd, 1999). This counters the results from heuristics and biases research. Hence, heuristics can be fast-and-frugal, and thus can positively contribute to SDM processes. On a critical note, the few studies that have taken this perspective and tested it empirically yielded mixed results (Astebro & Elhedhli, 2006).

The third heuristics approach in SDM research is the simple rules program. This research emphasizes that (teams of) strategic decision-makers learn specific types of unique heuristics for capturing opportunities or avoiding failure. Strategic decision-makers learn from their process experience, which over time results in an *increasingly* strategic portfolio of heuristics (Bingham & Eisenhardt, 2014). Complementing the first two views on heuristics, the simple rules program's view on heuristics argues that they are not automatically gathered and applied, rather, they are gathered and applied in a thoughtful manner. These short rules guide SDM processes in a specific time frame.

Summarizing this section, it becomes clear that to advance our understanding of SDM information processing, the bounded rationality approaches that were born out of Simon's theorizing (1947) seem to be the more fruitful perspective opposed to the unbounded rationality approaches. Bounded rationality is specifically tuned to take the micro processes of information processing in SDM as its focus, whereas unbounded approaches often regard information processing of strategic decision-makers as a black-box which behave perfectly rational and thus produces highly predictive outputs and outcomes. Moreover, bounded rationality approaches open-up the SDM black-box, and currently bounded rationality approaches form the richest, most dominant perspective to study how a strategic decision-maker processes information (Basel & Bruhl, 2013). The three heuristics programs all connect on the notion that heuristics are cognitive shortcuts potentially simplifying individual cognitive processing, and decision-making more quickly. The three approaches contrast on the level of application (universal – unique), amount of cognitive processing (automatic – thoughtful), and the impact on decision quality (negative – positive). Although SC scholars acknowledge the importance of heuristics in SDM, to date it remains unclear what role heuristics actually play in SDM information processing. Bingham and Eisenhardt (2014) therefore advocate an integrated view of heuristics for SDM research because the diverse views could by means of their diverse analytical foci complement each other. Therefore, SDM scholars stress the potential for applying dual process modeling in SDM cognition research (Basel & Bruhl, 2013). In comparison to the three heuristics programs, dual process models put more emphasis on the relationship between the actual information being processed, and a strategic decision-maker's intentions and behavior when processing information, another key theme in SDM research that found ample application to date (Basel & Bruhl, 2013). Fortunately, dual process modeling finds a long history of application in human information processing research, to come to grips as to how humans

respond to differential information inputs from multiple sources. This model is introduced in the next section.

Human information processing as dual processing

In this section the dual process models touched upon in the previous section are shorty introduced followed by discussing its complements to current SC research. Human information processing (HIP) research, a long-standing research tradition, studies information processing of humans in roles such as consumer, citizen, patient and the like. To study HIP, it is observed that mainly dual process models are used as the theoretical framework. Two prominent dual process models are the greatly similar heuristic/systematic model of information processing (HSM) and the elaboration likelihood model of persuasion (ELM) (Chaiken, 1980; Chaiken & Maheswaran, 1994; Petty & Cacioppo, 1986; Petty, Rucker, Bizer, & Cacioppo, 2004). HSM aims at explaining how people receive - and process persuasive messages. The model states that individuals process information either heuristically (effortless) or systematically (effortful). Similar to the simple rules program, HSM acknowledges that heuristics are learned knowledge structures that can be stored in memory for future use. Heuristic processing is managed by the heuristics being actually stored, in memory (acceptability), the ability to retrieve from memory (accessibility) and the relevance for the task (applicability). Systematic processing involves more cognitive processing effort for the judgmental task. In systematic processing, reliability of the source of the message's content is carefully examined.

ELM also maps out two routes to persuasion, two extreme ends on a continuum of processing effort; central- and peripheral processing. These processes are similar to the heuristic-systematic distinction in HSM. In central (effortful) processing the strength or quality of the message's content (i.e. argument quality) is held to drive an individual's information processing (Petty et al., 2004). Two necessary conditions for an individual to process information centrally are an individual's motivation and ability (Petty & Cacioppo, 1986). In peripheral (effortless) processing, cues (e.g. source credibility, source attractiveness and number of arguments) are thought to be more crucial to achieving persuasive effects than the message's actual content. In general, peripheral processing often prevails, because individuals cannot elaborate extensively on every message they receive. ELM literature suggests, like HSM, that attitude changes induced through the central (systematic in HSM) route tend to be more persuasive and persistent over time, while changes induced through the peripheral (heuristic in HSM) route tend to decay more quickly. The two routes are thus antagonistic in their persuasive outcomes and in addition, central- and peripheral processing can occur simultaneously (Crano & Prislin, 2008; Petty & Cacioppo, 1996). Unlike HSM logic, ELM states the multiple roles postulate, arguing that a single variable can play multiple roles in a persuasion process. Depending on the amount of

initial elaboration, a variable can serve as an argument (high elaboration), as a peripheral cue (low elaboration), and as a factor affecting the amount or direction of elaboration (middle range elaboration). Bringing this multiple roles postulate back to the central role(s) heuristics play in different branches of SDM research; a heuristic might thus also serve different roles in ELM. Another difference between HSM and ELM is the possibility for a heuristic to be processed with cognitive effort. ELM's multiple roles postulate and the neutral phrasing of the dual processes, as central and peripheral, could more easily incorporate this idea in its theorizing. Whereas for HSM this would be problematic, because the key distinction made in this model is between heuristic (effortless) and systematic (effortful) processing. Clearly HSM and ELM have much in common and contribute to standing SC theorizing. Like in SC research also HSM and ELM differ on the role heuristics play in information processing. HSM opposes heuristic (effortless) processing to systematic (effortful) processing (Frankish, 2010), whereas ELM does not.

Having reviewed two dual process models dominant in HIP research, let us continue with briefly discussing the current state of the art research and the field's knowledge gaps with regard to HIP. In the past decades, dual process researchers operationalized and tested a variety of message related variables, mostly in experimental designs (Boster & Mongeau, 1984; Chaiken, 1980; McCroskey, 1969; O'Keefe, 1990; Petty & Cacioppo, 1986; Stiff, 1986). Currently, a debate that continues to be unresolved in the study of effectiveness of informational inputs: whether statistical – or narrative evidence is more persuasive for its recipients. Many empirical studies devoted their attention to resolve this dispute to no avail. On the one hand, there is support that statistical evidence is more persuasive then narrative (Allen & Preiss, 1997). One meta-analysis showed that statistical is more powerful than narrative evidence. (Massi Lindsey & Yun, 2003) Counterevidence is also present, however; other scholars find that narrative evidence is superior over statistics as persuasive evidence (Ah Yun & Massi, 2000; Baesler & Burgoon, 1994; Chaiken & Maheswaran, 1994; Greene & Brinn, 2003; Hoeken, 2001a; Hoeken & Hustinx, 2006; Hornikx, 2005, 2007, 2008; Reynolds & Reynolds, 2002; Slater & Rouner, 2002). There are also studies that report there is no clear advantage for either one of the evidence types (Brosius, 2000; Dickson, 1982; Kahneman & Tversky, 1972; Kahneman & Tversky, 1973; Kazoleas, 1993; Morgan, Cole, Shuttmann, & Piercy, 2002; Nisbett & Borgida, 1975; Nisbett & Ross, 1980; Reinard, 1988; Sherer & Rogers, 1984; Stitt & Nabi, 2005; Taylor & Thompson, 1982).

To complicate matters, this debate is recently extended with research concluding that a combination of both narrative and statistical evidence would be even stronger than the individual evidence types, and would help to resolve the debate. However, to date, only few studies have investigated this extension and results are still inconclusive (Baesler, 1997; Cox & Cox, 2001; Hoeken, 2001b; Iyengar & Kinder, 1987; Nadler, 1983).

Conclusion: Identifying the knowledge gap regarding decision maker persuasion

HIP Scholars provide several explanations why the narrative versus statistics debate remains unresolved (Shen & Bigsby, 2013). The main rationale provided by scholars studying persuasion is that many message -, source -, recipient - and context variables can have complex interactions and effects, implying increasing persuasion power in some situations and decreasing in others (Allen et al., 2000; Good, 2010; Hornikx & Houët, 2009; Shen & Bigsby, 2013). Additionally, it seems that the theoretical grounding arguments (i.e. the [meta-] theoretical mechanisms, typologies, definitions, etc.) to clearly understand the differences and commonalities between statistical – and narrative evidence are found to be absent in current HIP research. This absence of theoretical grounding arguments might be another explanation why inconclusive findings continue to emerge regarding the prevalence of either statistical - or narrative- or a combination of both evidence types, or so called grounds of an argument. So, clearly a lot of work remains to be done to define under what conditions statistical or narrative evidence types are more persuasive (Shen & Bigsby, 2013) in decision-making. This dissertation wishes to add to these efforts by taking on a new vantage point.

The on-going HIP debate about which evidence type is most persuasive could be advanced by shifting the analytical focus away from ground or evidence type to the meta-framing of the argument structures themselves (Toulmin, 1958). However argument meta-framing as a construct, as well as the relationship between argument meta-frame and message effectiveness, has neither been discussed theoretically nor studied empirically. This study therefore develops and tests such a line of argument. Meta-framing of an argument refers to the assumptions about human nature and the ontological, epistemological, and methodological positions which taken together enable and constrain the argument logic, what Toulmin (1958) calls its claim, ground, and warrant. A distinction is made between objectivistic and subjectivistic argument meta-framing (Burrell & Morgan, 1979), enabling relating the results of the present study to existing research. These modes of inquiry are chosen because their research logic equates a preference for either statistical or narrative grounds in a larger argument structure (Toulmin, 1958) as will be further theorized and operationalized in this dissertation.

The processing of arguments is not just a HIP topic, it also is a topic dubbed to be central to the study of information processing in SDM practices, because still little is known about the persuasive effects of qualitatively different arguments on strategic decision-makers (Basel & Bruhl, 2013; Gigerenzer & Gaissmaier, 2011; Hodgkinson & Starbuck, 2008). So, for the purpose of improving our understanding of strategic decision maker's use of first-hand insights, it is concluded that SC research has to be combined with HIP's standing dual processing

research (Basel & Bruhl, 2013; Bingham & Eisenhardt, 2014). Thus, standing on the shoulders of current leading SC and HIP scholars, the following main research question is formulated:

Main research question 1:

What type of argument meta-framing, objectivistic- or subjectivistic, is most persuasive for strategic decision-makers?

1.3.2 End-user assessments of information technology

In the end-user assessment of information technology (IT), the second topic addressed in this dissertation, the objectivistic-subjectivistic dualism also takes a central role in discussions about theory development. Before jumping to this discussion, first a brief overview is provided of the field of research dedicated to the study of end-user assessment of IT. Next, the subjective-objective dualism present in this field of research is reviewed in terms of the prevalence of, and connectedness between typical objectivistic – and subjectivistic user assessment of IT. Third, from the observed status quo this dissertation's second research question is formulated.

Literature in IS/IT investigates the factors and processes that link IT investments with the assessment of (economic) value. Generally, these factors and processes are tied to end-user's assessments about IT. A wealth of research has been developed about end-users' assessment of technology (DeLone & McLean, 1992), not coincidentally because end-users assessment of technology comprises a key strategic asset for organizations today (Walsh, 2014). In end-user assessment research, there are two dominant streams: user satisfaction (Bailey & Pearson, 1983; Ives, Olson, & Baroudi, 1983; Melone, 1990; Seddon, 1997) and technology acceptance (Davis, Bagozzi, & Warshwa, 1989; Hartwick & Barki, 1994; Venkatesh, Michael, Gordon, & Davis, 2003). Combinations of both streams of research have been proposed as well (Wixom & Todd, 2005). Along these lines of research, the study of user assessment of IT has grown to be a substantive body of research and can nowadays be seen as a rich tapestry of diverse research paradigms, methods and approaches (Wade & Hulland, 2004). Currently, the objective paradigmatic perspective, as compared to a subjective paradigmatic perspective, was and is the dominant perspective in North American and European Information systems journals (Becker & Niehaves, 2007; Chen & Hirschheim, 2004; Cordoba, Pilkington, & Bernroider, 2012; Orlikowski & Baroudi, 1991). Orlikowski & Baroudi (1991), reviewing 155 articles published in between 1985-1989, report that 96.8% of all articles are objectivistic in nature and 3.2% is subjectivistic. Chen & Hirschheim (2004), reviewing 1,893 articles published in eight major journals in the 1991-2001 period, report that the dominance of the objectivistic approach has reduced somewhat. Chen & Hirschheim report that 81% of all studies are objectivistic in nature, whereas 19% is subjectivistic. In addition, Becker & Niehaves (2007) refine the

results from Chen & Hirschheim's study by deviding the dataset in two geographical regions: North American and European journals. From this analysis, Becker & Niehaves observe that the prevalence of articles with an objectivistic orientation is bigger in American journals (89% objectivistic) than in European Journals (66% objectivistic), as seen in Table 1.1.

Table 1.1 Paradigmatic diversity in IS research (n=1893 papers) [Adapted from Becker & Niehaves, 2007]

Paradigm	American journals	European journals
Objectivistic	89%	66%
Subjectivistic	11%	34%

More recently, Cordoba et al. (2007) conducted an empirical citation and co-citation analysis of two main academic IS journals; a European journal (EJIS) and a North American Journal (MISQ) in the 1995-2008 period. Cordoba et al. divided this period into three equal cohorts of 5 years enabling them to study the IS fields dynamics over time. Relying on Abbot's (2012) framework for understanding social science knowledge disciplines,[6] Cordoba et al. find similar results in their analysis as to the dominance of the objectivistic over the subjectivistic perspective across both journals reviewed. Cordoba et al. conclude that the field has left behind its periods of differentiation (1995-1999) and competition (1995-1999 and 2000-2004) and recently moved in a state of absorption (2004-2008) in which the objectivistic orientation has consolidated its dominance across the articles in both MISQ and EJIS. Following the empirical analysis above, it can be concluded that the most prevalent perspective both in Europe and in North America was and is the objectivistic perspective. Moreover, this difference was and continues to be more pronounced in the North American MISQ than in the European EJIS. In addition, although the application of multiple methods research has become quite common in the past three decades, its application remain however within the boundaries of one single paradigm (Abbott, 2001). An alternative paradigm to the objectivist paradigms is often regarded as anecdotal, discussions centring around this topic remain conceptual in nature, and thus little effort has been paid to empirically inquire IS phenomena in a multi-paradigmatic way in the past (Becker & Niehaves, 2007; Chen & Hirschheim, 2004; Hirschheim, Klein, & Lyytinen, 1996; Hirschheim & Klein, 1989; Wicks & Freeman, 1998).

6 Abbott proposes that a discipline provides knowledge that contributes to diagnose, treat, and infer on a particular set of problems in practice, such as the Information Systems discipline. In general Abbot theorizes that disciplines continuously compete with each other to gain jurisdiction to a domain of knowledge. Thus, social science (knowledge) disciplines have to continuously show, while in competition with other disciplines, that what they do is relevant for the professions they serve in society. They do so by means of 3 iterative processes of: differentiation, competition and absorption (Cordoba et al., 2012:481).

Conclusion: identifying the knowledge gap about end-user assessment of IT

Summarizing, first-hand insights about end-users of IT are a key strategic asset for organizations today (Walsh, 2014), and as such comprises a rich tapestry of diverse research methods and approaches (Wade & Hulland, 2004). Taking a closer look at the field's variety, it becomes clear that knowledge about an end-user's technology assessment is developed in unconnected, maybe even competing, objective and subjective research paradigms (Becker & Niehaves, 2007; Hirschheim et al., 1996; Hirschheim & Klein, 1989; Wicks & Freeman, 1998). This can hinder the field's ability to accumulate knowledge (Cordoba et al., 2012). Especially taking into account that besides an on-going theoretical discussion, there is ample empirical support that multiple paradigm research could indeed be instrumental to accumulate knowledge about end-user assessments of technology. So the knowledge gap explored is to find out in what ways empirical multi-paradigm research can complement each other for the purpose of knowledge accumulation.

Therefore, with the wish to inspire this standing theoretical discussion, this dissertation brings the standing theoretical discussion to the empirical level by posing the following question:

> *Main research question 2:*
>
> *In what ways can objectivistic and subjectivistic end-user assessments of IT complement each other?*

1.4 Approaches taken in this dissertation

In the research questions presented above, a distinction is made between objectivistic and subjectivistic framing. This necessitates a multi-paradigm and multi-method research design for this dissertation, because these two categories comprise two distinctly different paradigms of social inquiry. Each paradigm with its distinct assumptions regarding ontology, epistemology, methodology and human nature, hence providing distinctly different lenses to view the world as is illustrated in Figure 1.1. Combining objectivistic assumptions about reality provides a lens that mirrors or represents reality. Combining subjectivistic assumptions enables the construction of an impressionistic lens that re-presents reality. This distinction will be advanced in the chapters to come, and culminates in chapter 6 where argument meta-framing is further defined and operationalized.

With the aim of studying the complementary nature of the objectivistic - and subjectivistic (O-S) research traditions, I intended to hold this O-S dualism in dynamic tension throughout the research process. In other words, no a priori stance for either side of the O-S dualism was taken,

or either one of the lenses depicted in Figure 1.1. This approach could be regarded *dynamic* because the researcher moved back and forth between positions/logics for the purpose of gaining maximal understanding from within (following through), and between (commonalities and differences) both positions/logics (Chen & Hirschheim, 2004; Schultz & Hatch, 1996). The word *tension* is used to emphasize that this dissertation's main interest is in preserving the tension between commonalities and differences at the paradigmatic level (ontology, epistemology, methodology, human nature) in order to theorize IT end-user assessment in new ways (Burrell & Morgan, 1979; Schultz & Hatch, 1996). This simultaneous recognition of differences and commonalties between paradigms is coined an interplay strategy (Schultz & Hatch, 1996).

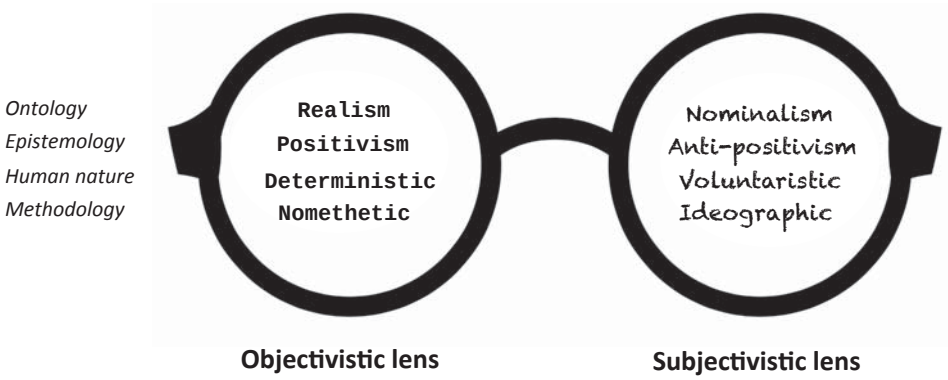

Figure 1.1 Objectivistic and subjectivistic framing, as complementary lenses to re(-)present first-hand insights (Adapted from Burrell and Morgan, 1977:6).

Pushing the lens metaphor a bit further (Figure 1.1); the spectacle frame can thus be regarded as the solid framework that allowed me to follow through the logic of each individual lens in a parallel manner, just by closing one eye and opening the other. Following this approach, I was able to view the world through just one lens, gaining understanding from within one single paradigm. While one of my eyes took turns in being open/closed throughout the research process, I was able to move back and forth between the two lenses, which enables gaining understanding of both ways of reasoning. In the end, I could open both eyes simultaneously and was able to study the complements of the two lenses from both the empirical data collected throughout the research process, and from the experience gained throughout the research process.

This research approach was also purposely chosen to inspire the focal organization with multiple constructions, to frame first-hand insights from citizens and police officers alike. In doing so it

increased this dissertation's potential as a resource for future (IT) development practices within the focal research context. Since, as pointed out in section 1.2, at the outset of this study there were no organizational practices, routines and techniques regarding end-user assessment of technology in the context of IT related strategic decision-making at the Dutch police.

Furthermore, throughout the study the *grammatical person* changes from first to third person. Let there be no mistake that it is *me* who took the lead in writing all the different chapters. However, I adapted the narrative voice to reflect the tradition in which I wrote the chapter. Meaning that for example in chapters 2, 3 and 6 I took a *detached* third person voice because of the discursive requirements of these *objectivistic* chapters. By contrast, in chapter 4 the grammatical person chosen was we (first person, plural) because taking a *social-constructionists* principles at the centre to maximizing the opportunity to *give voice* to police officers, through narrating our joint research efforts we (executive police officers and me) made.

1.5 Dissertation outline

This section outlines the flow of this dissertation. The research questions posed in the previous sections are taken as a starting point and answering these questions as an end-point. Figure 1.2 provides a visual representation of the structure of this dissertation. The chapters 2-5 aid in answering this dissertation's research question pertaining to end-user assessment research, i.e.: 'in what ways can objectivistic - and subjectivistic end-user assessments of IT complement each other?' The acquired insights, subsequently serve as information inputs for chapter 6, in which this dissertation's main research question 1, namely: 'What type of argument meta-framing, objectivistic- or subjectivistic, is most persuasive for strategic decision-makers?' will be answered. Furthermore, comparing the results from chapters 2-5 in chapter 7, enabled answering the second main research question as to in what ways can objectivistic – and subjectivistic end-user assessments of IT complement each other.

Taking a closer look at the research flow depicted in Figure 1.2 provides the following picture. This dissertation is designed in such a way that both the objectivistic – and subjectivistic IT end-user assessment research can be explored theoretically and empirically. For the objectivistic end-user assessment research this is accomplished by first defining what comprises objective IT end-user research by reviewing the current status of IT end-user assessment research.

A substantial amount of research has been conducted in this field of research, and by 1992 Delone & McLean found a scattered field consisting of nearly 180 different measures all measuring information system success from the perspective of the intended end-users of Information Systems. Chapter 2 is therefore aimed at providing insight to what extent

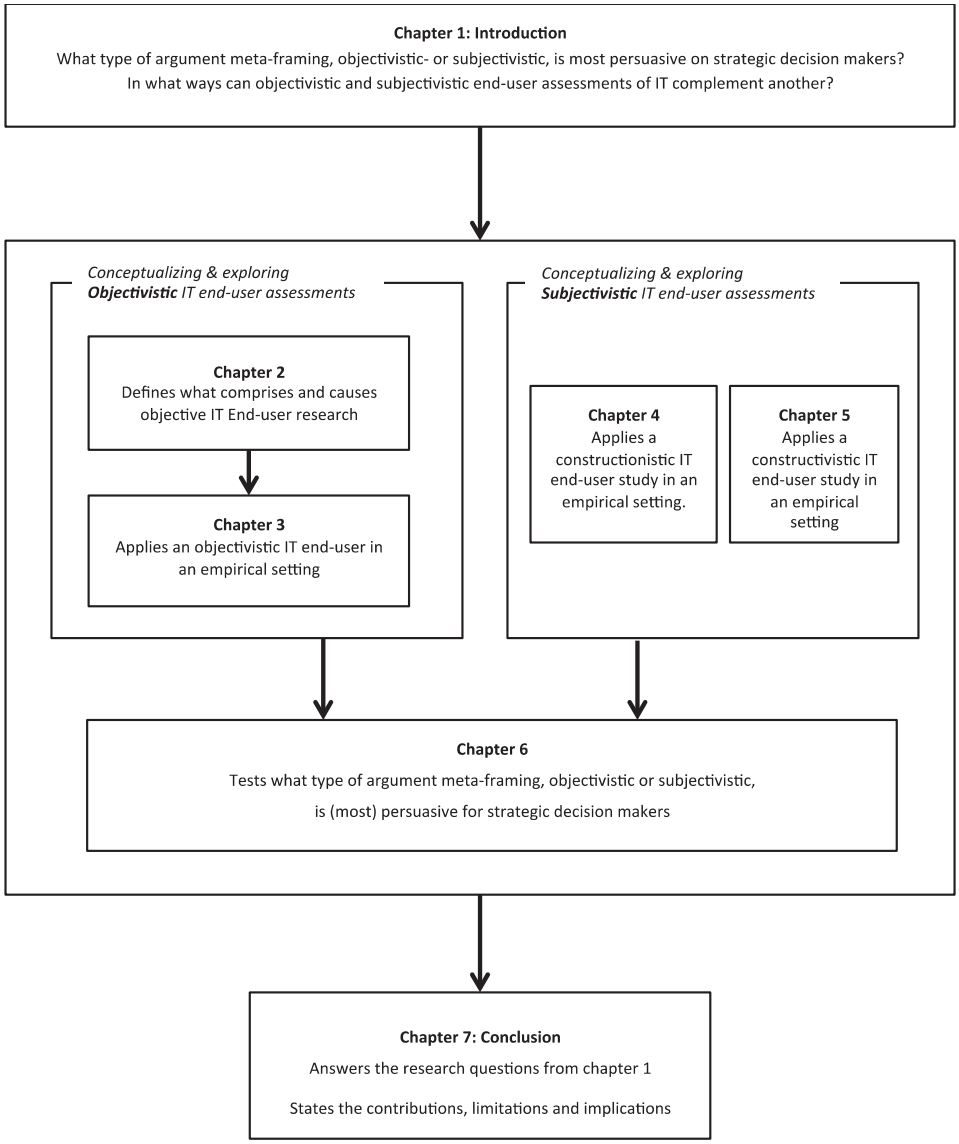

Figure 1.2 General flow of this study.

convergence has occurred over time regarding what comprises an Information System to be successful from the perspective of its end-users. In this literature review prior objectivistic IT end-user assessment research was evaluated. In doing so it provides detailed understanding regarding the logic as well as the current state of the art insights regarding objectivistic end-user assessment of technology.

In chapter 3 the acquired insights from chapter two enable the application of objectivistic IT end-user assessment research in an empirical setting involving citizens assessing video-mediated crime reporting at the Dutch police. This chapter is aimed at determining which factors influence user acceptance of video-mediated communication in the delivery of public services. This is achieved through replicating and extending the unified theory for the acceptance and use of technology (Venkatesh et al., 2003). The results from chapter 3 serve as a representation regarding what could comprise an objectivistic meta-frame in the SDM study presented in chapter 6.

In chapter 4 and 5 the subjectivistic IT end-user assessment research tradition is explored. It is less evident to unequivocally represent and define one set of parameters defining subjectivist IT end-user assessment research. The subjectivitistic paradigm tends to form a rich tapestry of approaches and analytical foci and its results often tend to be highly contextual by nature. Combining these characteristics makes a literature review seem less obvious technique to come to grips with this research approach, compared to the objectivistic approach. Therefore, two generally agreed upon subjectivistic positions were a-priori selected. These positions were explored empirically in the context of interest to come to understand the premises of a subjectivistic IT end-user assessment from within its paradigmatic boundaries. A constructivistic and constructionistic perspective were chosen to re-present a subjectivistic approach. These two complementary perspectives were chosen because, through their distinct analytical foci, they together capture a large variety of what can comprise a subjectivistic approach. With regard to their analytical focus, constructionists take understanding between people and within societies to their analytical centre. Constructivists emphasize an individual's unique systems of understanding.

Chapter 4 describes a subjectivistic end-user assessment study using constructionist principles. This chapter is aimed at exploring how large scale participatory research can be undertaken to enhance IT strategic decision-making with first-hand insights from IT end-users. In this chapter Appreciative Inquiry and Q-methodology principles are combined in such a way that a large group of police officers can jointly construct their appreciation of the IT's they use in their jobs. Therefore, chapter 4's results provide in-depth understanding of what comprises a constructionistic IT end-user assessment through its rigorous conceptualization and empirical exploration.

Chapter 5 applies constructivistic principles to come to understand how citizens form their assessment of video-mediated crime reporting. In this chapter video-mediated crime reporting is studied like in chapter 3. Complementing chapter 3, chapter 5 is aimed at identifying the processes, as opposed to the factors in chapter 3, leading citizens to accept video-mediated

crime reporting.[7] Through the development of a process theory of technology acceptance, this study provides in depth understanding as to how and why citizens come to their acceptance judgements of video-mediated crime reporting. So, both chapters 4 and 5 inform what comprises a typical subjectivistic meta-frame, and thus serve as the subjectivistic information inputs for the study of information processing in SDM.

Chapter 6 is aimed at acquiring insight into what type of argument meta-framing, objective or subjective, is most persuasive for strategic decision-makers, and it provides insight into how, effortful or effortless, strategic decision-makers process heuristics. The persuasive appeal of objectivistic and subjectivist argument meta-framing is tested in an experimental setting involving strategic decision-makers of the Dutch police. The empirical material from the citizens' assessments of video-mediated crime reporting, taken from chapters 3 and 5, are used to form manipulations. This chapter provides empirical results from which both the impact of meta-framing, and decision-makers' processing of heuristics can be estimated.

In the concluding chapter 7 the two research questions of this dissertation are answered, its contributions to theory and practice are stated and suggestions for future research are provided. Research question 1 will be answered directly through the results of the strategic decision-maker experiment (chapter 6). Research question 2 can be answered by comparing the results of the meta-study of objectivistic end-user assessment research (chapter 2) with the results from the subjectivistic AI/QM study (chapter 4), and the results of the objectivistic – and subjectivistic citizen assessment studies of virtual crime reporting, presented in chapters 3 & 5.

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7 Data-collection for the chapter 3 and 5 studies was done simultaneously in time. Citizens were included either in chapter 3 or in the chapter 5 study. Generally citizens were automatically included in the chapter 3 study, except for the a-select moments in time when an interviewer was present at the research sight, then citizens were included in chapter 5.

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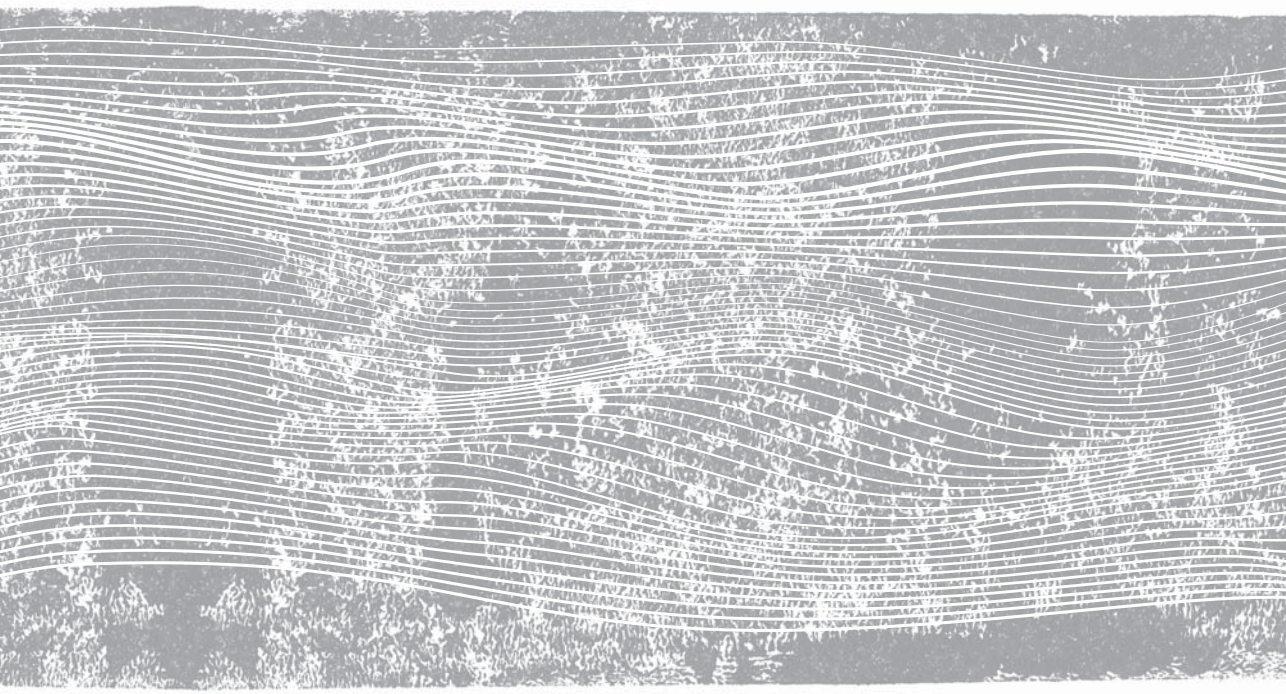
Chapter 2

Convergence in information system success? A literature assessment



ABSTRACT

Although investments in information systems (IS) are substantial, success is not evident. IS success and its determinants have been studied extensively. In 1992, DeLone & McLean observed a scattered field; consisting of nearly 180 different IS success measures. Has IS success research shown signs of convergence since this seminal study? This study is aimed at providing insight to what extent convergence has occurred regarding what comprises and causes IS success. A review was performed using 13 metastudies & -analyses published between 1992-2008, all covering one or more aspects of IS success. We found strong indications for convergence on what comprises IS success. Five concepts recur: net benefits, satisfaction, use, system- and information quality. Convergence considering what causes IS success occurs to a lesser degree, suggesting multiple factors impact IS success. Nevertheless, the predictors: participation, involvement, facilitating conditions and top management support return across studies.

1. INTRODUCTION

Investments in information technology are substantial. Some sources indicate that, since the 1980s, 50 percent of all new capital brought into organizations has been invested in information technology (Westland & Clark, 2000:530). Fortune 200 firms spend between 20 and 40 percent of their operating budget on IT, just to stay competitive (May, 2001). In 2008, organizations continue to increase information technology (IT) spending and also budgets continue to rise, even in the face of economic downturns (Kanaracus, 2008).

It is evident that management perceives Information Systems (IS) as crucial ingredients for the management of business processes and improving the efficiency of both profit and non-profit organizations. Beside the increasing cost and importance of information technology, it is also a source of increasing concern. Many IT investments bring disappointing results or even fail, so it is reported. The Standish Group found that more than half of the software projects undertaken in the United States fail, wasting billions of dollars annually. Hitt et al. (2002) state that ERP systems, a specific type of IS, even have higher failure rates. Daniels and LaMarsh (2007) report a failure rate of IT investments close to 70 percent. Hochstrasser and Griffiths (1991) and Willcocks and Lester (1993) found similar results. Combining the high investments and the reported failure rates it is evident that IS success research is a fundamental topic for both the IS researcher and practitioner alike and of vital importance for organizations and their stakeholders. It is therefore not surprising that research observed that the assessment of *IS success* is perceived as a key issue for organizational executives (Irani & Love, 2000; Thathcher & Oliver, 2001) and is widely accepted as the principal criterion for IS evaluation (Rai et al., 2002). In the past 30 years, IS success research has grown to be a substantive

body of research. Theorists were however struggling which construct(s) best representing IS success. It was not surprising that by 1992 DeLone and McLean observed that the field encompassed nearly as many dependent variables as studies. Their study indicated a lack of convergence regarding the variables present in models of IS success. Studying convergence in IS success is important because it provides us both insight in the validity and reliability of the dependent variable of interest, the IS success construct, as well as the sparseness with which it is operationalized. Furthermore, it provides a key insight in the parsimony with which the variation(s) in the IS success construct can be predicted by the independent variables, that is the factors that affect the IS success construct. Following this lack of convergence, DeLone & McLean proposed an IS success model to provide guidance for future IS research. This model was an attempt to come to convergence IS success research. However, has convergence in IS success research indeed occurred, ever since DeLone and McLean's observations and the subsequent introduction of their IS success model? Since 1992 a number of meta-studies and alternative models have been proposed, all covering a part to answer this question, none of them however provided a model- or theory independent perspective to inquire the state of convergence. To provide clarity regarding what comprises and causes IS success, this literature review is therefore aimed at providing insight whether, and if so to what extent, convergence has occurred regarding what comprises and causes IS success. Because of the assessment of the literature, a renewed model is presented, which carries the current state of knowledge regarding what comprises and causes IS success. This review is structured in the following way. First, IS success is defined and an overview of the major theories that ground IS research are related to IS success. Next, the methodology used to inquire convergence in this review is presented. Third, the results from the review are presented and subsequently conclusions are drawn. Finally, implications for future research & practice are proposed and limitations are discussed in the discussion section.

2. DEFINING IS SUCCESS & THEORIES ON IS SUCCESS

IS success research is one specific branch of IS evaluation studies. Smithson and Hirschheim (1988; 1999) distinguish between evaluation on a macro, sector, firm, application and stakeholder level. Following this distinction, IS success research focuses primarily on the stakeholder level and the stakeholder is mostly reduced to the user of an information system. For the purpose of this review IS success is defined as 'a measure of the degree to which the person evaluating the system believes that the stakeholder, in whose interest the evaluation is being made, (i.e. the user of IS in the studies reviewed) is better off' (Seddon, 1997:246). The

criteria for measuring IS success originate from basically two lines of research, often referred to as acceptance and satisfaction oriented research (Hirschheim & Smithson 1988; Melone, 1990; Hirschheim & Smithson, 1999; Whittaker, 2001; Wixom & Todd, 2005). In addition, in the past two decades a number of scholars have studied the combination of acceptance and satisfaction literature by means of (integrated) IS success models (DeLone & McLean, 1992; Seddon, 1997; DeLone & McLean, 2003; Wixom & Todd, 2005; Petter et al., 2008). Following this agreed upon distinction, an overview of (a) acceptance literature (b) satisfaction literature is provided and related to IS success and lastly an overview of (c) IS success models is provided. Providing such an overview, makes the theoretical roots of the discipline visible and provides a theoretical point of departure from which to inquire convergence of IS success research. In the extent of this study, this body of literature is mainly used as a frame of reference, for example, to explain contradicting findings of IS success operationalisations, and opposing relationships between variables across the studies incorporated in this review.

A. Acceptance literature

Scholars have long studied how and why individuals adopt new technologies. The major theories which influence acceptance models are the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), Theory of Planned Behavior (TPB) (Ajzen, 1985; Ajzen, 1991) and Innovation Diffusion Theory (IDT) (Rogers, 1983). Venkatesh et al. (2003), who thoroughly reviewed acceptance literature, found another five competing theoretical models explaining an individual's acceptance of technology. A review of these eight theoretical acceptance models is presented in Table 2.1. This table summarizes for each theoretical model; the key contributor, fundamental premise, relationship with IS success and the theory's core constructs. All acceptance models presented in Table 2.1 share the understanding of usage of a technology by an individual is of key concern, and the role of intention as a key predictor for this behavior. Venkatesh et al. visualized the basic model underlying all acceptance models as illustrated in Figure 2.1. This model visualizes the combination of sequential and reciprocal relationships with which intentions towards using technology, reactions towards using technology, and actual use of technology are connected.

From Table 2.1 It becomes clear that IS success, in acceptance-oriented research, is associated with an individual's intention to use, or by the actual use of a technology. The proxies for success vary from adoption (IDT), (intention to) use (TRA, TPB, TAM1/TAM2, MM, SCT, UTAUT) to utilization (MPCU).[1] Returning predictors for an individual's (intention) to use a

1 The abbreviations placed in parenthesis refer to the abbreviations of acceptance literature as used in Table 2.1.

Table 2.1 Overview of acceptance models underlying IS success research

Theory / model / Taxonomy (major contributor)	Fundamental premise	Explanation of IS success	Core constructs
Theory of reasoned action [TRA] (Fishbein & Ajzen, 1975)	Individual behavior is driven by behavioral intentions which comprise attitude and social norm	Individual behavior, use, is a proxy for IS Success and is determined by an individual's evaluative affect and subjective norm	Attitude towards behavior: 'an individual's positive or negative feelings (evaluative affect) about performing the target behavior' (Fishbein & Ajzen, 1975:216) Subjective norm: 'the person's perception that most people who are important to him think he or she should or should not perform the target behavior in question (Fishbein & Ajzen, 1975:302)
Theory of planned behavior [TPB] (Ajzen, 1985; Ajzen, 1991)	Extension of TRA; perceived behavioral control is added to TRA as a predictor for individual behavior	Individual behavior, use, is a proxy for IS Success which is determined by an individual's evaluative affect and subjective norm (both TAM) and perceived behavioral control	Perceived behavioral control: 'the perceived ease of difficulty of performing the behavior' (Ajzen, 1991:188) in IS research; 'perceptions of internal and external constraints on behavior' (Taylor & Todd, 1995)
Innovation diffusion theory ([DT] (Rogers, 1983; Rogers, 1995; Moore & Benbasat,1991)	Individuals possess different degrees of willingness to adopt innovations	The degree of adoption, or use, of an IS by end-users determines IS (implementation) success; this is caused by relative advantage, ease of use, image, visibility, compatibility, results demonstrability and voluntariness of use	Relative advantage: 'the degree to which an innovation is perceived as being better than its precursor' (Moore & Benbasat, 1991:195) Ease of use: 'the degree to which use of an innovation is perceived to enhance one's image or status in one's social system' (Moore & Benbasat, 1991:195) Image: 'the degree to which one can see others using the system in the organization' (Moore & Benbasat, 1991:195) Compatibility:' the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adapters' (Moore & Benbasat, 1991:195) results demonstrability: 'the tangibility of the results of using the innovation, including their Observability and communicability ((Moore & Benbasat, 1991:203) Voluntariness of us:' the degree to which use of the innovation is perceived as being voluntary, or of free will (Moore & Benbasat, 1991:195)

Table 2.1 continues on next page

Table 2.1 ***Continued***

Theory / model / Taxonomy (major contributor)	Fundamental premise	Explanation of IS success	Core constructs
Technology acceptance model [TAM / TAM2] (Davis, 1989; Bagozzi et al, 1992)	When users are confronted with a new technology, a number of factors influence their decision about how and when they will use	Success is determined by how and when an end-user uses a system; which is determined by the perceived usefulness and perceived ease of use	Perceived usefulness: 'the degree to which a person believes that using a particular system would enhance his or her job performance' (Davis, 1989:320) Perceived ease of use: 'the degree to which a person believes that using a particular system would be free of effort' (Davis, 1989:320) Subjective norm: As in TRA
Motivational model [MM] (Vallerand, 1997; Davis et al., 1992; Taylor & Todd, 1995)	Behavior can be motivated intrinsically or extrinsically	Use, as a behavioral criterion for success, can be motivated intrinsically and extrinsically	Extrinsic motivation: 'the perception that users will perform an activity 'because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved Job performance, pay, or promotions' (Davis et al., 1992:112) Intrinsic motivation: the perception that users will want to perform an activity for no apparent reinforcement other than the process off performing the activity per se' (Davis et al., 1992:111)
Model of PC utilization [MPCU (Triandis, 1977; Thompson, 1991)	Derived from Triandis' theory of human behavior (Triandis, 1977) Thompson (1991) argues that utilization is affected by social factors, affect, perceived consequences and facilitating conditions	utilization as a proxy for success is determined by social factors, affect, perceived consequences and facilitating conditions	Job-fit: 'the extent to which an individual believes that using (a technology can enhance the performance of his or her job (Thompson et al., 1991:129) Complexity:' the degree to which an innovation is perceived as relatively difficult to understand and Use' (Thompson et al., 1991:128) Long term consequences: 'outcomes that have a pay-off in the future' (Thompson et al., 1991:129) Affect towards use: feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act' (Thompson et al., 1991:127)

			Social factors: 'the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific situations ' (Thompson et al., 1991:126) Facilitating conditions:' objective factors in the environment that observers agree make an act easy to accomplish' (Thompson et al., 1991:129)
Social cognitive theory [SCT (Bandura, 1986; Compeau & Higgins, 1995)	Human behavior is seen as an interaction of personal factors, behavior, and the environment	Usage, as the success measure, is determined by personal and environmental factors	Outcome expectations performance: 'the performance-related consequences of the behavior' (Compeau & Higgins, 1995) Outcome expectations personal: 'the personal consequences of the behavior' (Compeau & Higgins, 1995) Self-efficacy: 'judgment of one's ability to use a technology to accomplish a particular job or task' Affect: 'an individual's liking for a particular behavior' Anxiety: 'evoking anxious or emotional reactions when it comes to performing a behavior (using a technology)
Unified Theory for Acceptance of Technology [UTAUT] (Venkatesh et al., 2003)	Based on theories above, use behavior is determined by personal evaluations, personal attributes, social influence and facilitating conditions	An individual's affective reaction to using technology determines the amount of success, this is determined by personal evaluations (behavioral intentions, expectations) personal attributes (gender experience, age) social influence and facilitating conditions	Performance expectancy: 'the degree to which an individual believes that using the system will help him or her to attain gains in job performance' (Venkatesh et al., 2003:447) Effort expectancy: 'the degree of ease associated with the use of the system' (Venkatesh et al., 2003:450) Attitude towards using technology: 'individual's overall affective reaction to using a system' (Venkatesh et al., 2003:455) Behavioral intention to use the system: 'not defined' Facilitating conditions, anxiety, self efficacy & social influence: similar to MPCU

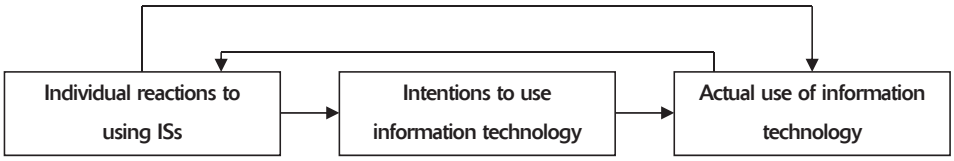


Figure 2.1 Basic concept underlying all acceptance models (Venkatesh, 2003:427).

technology are ease of use (IDT, TAM1/2, UTAUT), usefulness (TAM1/2), social- (IDT), and subjective norms (TRA, TAM1/2).

B. Satisfaction literature

A wealth of literature concerns the concept of satisfaction and its measurement (Gallagher, 1974; Bailey & Pearson, 1983; Ives & Olson, 1984) Relying on valid and reliable measures, satisfaction has been postulated as the supreme IS success measure more than once (Hirschheim & Smithson, 1988; Whittaker, 2001). Its theoretical background is however often only assumed (Mahmood et al., 2000) or weakly defined (Bailey & Pearson, 1983; Melone, 1990; Seddon, 1997). The major theoretical argument referred back to in current research is the Bailey and Pearson (1983) interpretation of Cyert et al. (1963), who state: 'the daily environment of the organization continually imposes upon managers the need for information. If a formal IS exists, its success at meeting those needs either reinforces or frustrates the user's sense of satisfaction with that source.' (Bailey & Pearson, 1983:530).

Melone (1990) provides some perspectives to progress the theoretical understanding of both the user satisfaction and its relation with the effectiveness or success of an IS. Melone (1990) explores and links satisfaction with: attitude research (MacGuire, 1969), expectancy-value theory, dissonance theory (Festinger, 1957) and self perception theory (Bem, 1967). Although those theories provide a basis to improve theoretical understanding of the user satisfaction construct, these theories are not picked-up in current research; see for instance the IS studies reviewed in the main part of this text. When theorizing satisfaction, all studies but one in this study's research sample, do so by referring to Bailey and Pearson, which is described above. Therefore, there is no purpose for bringing those theories in relation with this paper's purpose. Nevertheless, in addition to the work of Melone, Wixom and Todd (2005) put satisfaction in a similar attitudinal & behavioural (success) model as Melone (1990) proposed, which will be discussed in the following section.

C. Integrated- & IS success models

Three IS success models exist: (a) DeLone and McLean's (1992; 2003; 2008), theoretically based on two taxonomies: Shannon and Weaver's (1949) communication problem taxonomy and Mason's (1978) IS output taxonomy; (b) Seddon's (1997) and (c) Wixom and Todd's (2005), which both react to and built upon prior work of DeLone and McLean. All models are summarized in Table 2.2, in which for each model; the key contributor, fundamental premise, relationship with IS success and the model's core constructs are summarized.

Except for Wixom and Todd, IS success is regarded as a multidimensional and interdependent set of constructs. (DeLone & McLean, 1992; Seddon, 1997; DeLone & McLean, 2003; Wixom & Todd, 2005; Petter et al., 2008) The success constructs vary from one construct (a) use (Wixom & Todd, 2005), to multiple constructs like: (b) system quality, service quality, information quality, satisfaction, use and net benefits (DeLone & McLean, 2003; Petter et al., 2008) and (c) system quality, information quality, satisfaction, perceived usefulness and net benefits (Seddon, 1997).

DeLone and McLean proposed a multidimensional and interdependent success model, to provide 'a needed more comprehensive model of IS success than has been apprehended in the past' as pointed out in the introduction (DeLone & McLean, 1992).

Seddon's (1997) model provided a respecification of DeLone and McLean's model by introducing a behavioural model along the IS success model. For Seddon, the key problem in the success model proposed by DeLone and McLean is that it involves both causal (by means of variance) and process explanations in one model; this is especially problematic with the use construct. For Seddon this leads to "a level of muddled thinking that is likely to be counter-productive for future IS research" (Seddon, 1997:246). Seddon proposed to place the use construct outside the success model, to overcome this problem. In 2003 DeLone and McLean respecified their model, taking into account feedback from the scholarly field (Pitt et al., 1995; Seddon, 1997), by adding service quality to the model and replacing both individual- and organizational impact with the net benefits measure. Although empirically grounded (Rai et al., 2002) and having a high face validity, the link between IS success models and underlying theoretical mechanisms, explaining the relationships between constructs, has not been made explicit by either DeLone and McLean or Seddon. In 2005, Wixom and Todd made a theoretical integration between satisfaction and acceptance oriented models and subsequently tested its validity. Wixom and Todd's key driver to propose their success model was to theoretically integrate both the acceptance and satisfaction oriented models. Using the work of Fishbein and Ajzen (1980), they made this integration possible by distinguishing between object based beliefs (i.e. system and information quality), object based attitudes (i.e.

Table 2.2 Overview IS success models & taxonomies

Theory/model/ Taxonomy (Major contributors)	Fundamental premise	Explanation of IS success	Core constructs
Communication problem taxonomy [CPT] (Shannon & Weaver, 1948)	Information as the output of an information system or the message in a communication system can be measured on three levels	Information system success can be determined on a technical, semantic and effectiveness level	Technical level: the accuracy and efficiency of the system which produces the information (Shannon & Weaver, 1949) Semantic level: 'the success of conveying the intended meaning' (Shannon & Weaver, 1949) Effectiveness level: 'the effect of the information on the receiver' (Shannon & Weaver, 1949)
IS output taxonomy [ISOT] (Mason, 1978)	A communication theory (Shannon & Weaver,1949) based differentiation of influence levels of an information system	Information system success can be determined on the following dimensions: production, product, receipt, influence on receipt and influence on system	Production, product, receipt, influence on receipt, influence on system.
IS success model [D&M ISS1] (DeLone & McLean, 1992)	Information system success is multidimensional and interdependent construct and its definite conceptualisation depends on context	IS success comprises a system's quality, information quality, use, satisfaction, individual and organizational impacts.	System quality: 'the desired features of the information system itself' Information quality: 'the quality of the information system output' Use: as a recipient's consumption of the output of an information system' Satisfaction: 'a recipient's response to the use of the output of an information system'' Individual impact: 'the effect of information on the behavior of the recipient' Organizational impact: 'the effect of information on the behavior of the recipient' (DeLone &McLean, 1992)

IS success model [S ISS] (Seddon, 1997)	A respecification of D&M's success model: separation of behavioral (expectations & use) constructs from IS success constructs	IS success comprises measures of information- & system quality, measures of net benefits and perceptual measures such as perceived usefulness and user satisfaction	Perceived usefulness: 'the degree to which the stakeholder believes that using a particular system has enhanced his or her Job performance or his or her group or organization's performance' (Seddon, 1997:246) User satisfaction: 'a subjective evaluation of the various consequences evaluated on a pleasant-unpleasant continuum' (Seddon, 1997:246) Expectations about the net benefits of future IS use: 'valence-weighted sum of the decision maker's expectations about the costs and benefits of future IS use' (Seddon, 1997:246, after Vroom, 1964) IS use: 'using the system' (Seddon, 1997:246)
Revised IS success model [D&M ISS2] (DeLone & McLean, 2003)	IS success is a multidimensional and interdependent construct, its definite conceptualisation depends on context	IS success comprises a system's quality, information quality, service quality, intention to use, use, satisfaction and net benefits	Additional concepts to D&M success 1: Net benefits: the combination of all impact measures such as Individual- and organizational impact Service quality: 'the overall support delivered by the service provider'
Integrated user satisfaction & technology acceptance model [IUSTAM] (Wixom & Todd, 2005)	Links between object based beliefs of satisfaction literature and behavioral beliefs of acceptance literature	IS success is determined by use; object based beliefs influence intention to use by object based attitudes and behavioral beliefs & attitude	Object based beliefs: beliefs about information- and system quality (Wixom & Todd, 2005) Object based attitudes: satisfaction towards information and the system (Wixom & Todd, 2005) Behavioral beliefs: individual beliefs about a systems ease of Use and the usefulness of the information (Wixom & Todd, 2005) Behavioral attitude: the attitude towards use and usefulness (Wixom & Todd, 2005)
Revised IS success model [D&M ISS3] (Petter et al, 2008)	Information system success is multidimensional and interdependent construct and its definite conceptualisation depends on context	IS success comprises a system's quality, information quality, service quality, use, satisfaction and net benefits	Same as D&M success 1&2

information and system satisfaction), and behavioural beliefs (i.e. usefulness and ease of use & attitude). From this overview of IS success models it becomes apparent that IS success can be regarded as a multidimensional and interdependent construct. The precise number of success constructs seems to differ from one model to another and has changed slightly over time, as with the service quality construct. The theories and models presented in this section, will serve as a frame of reference for the analysis. Having introduced the key theories and models in IS research and having related them to the measurement of IS success, next the methodology for the inquiry into convergence of IS success and its predictors is discussed.

3. METHODOLOGY

This inquiry into the extent of convergence of IS success research asks for the selection and assessment of literature. The selection of literature was done using a set of heuristics that enabled the selection of a representative sample of the IS success research field. The subsequent assessment of literature was conducted using a set of evaluation criteria which served as indicators of convergence. Both the rationale for literature selection and assessment are presented below.

A. Selection of literature

Criteria for incorporating a study into the analysis are impact on the IS field; indicated by high citation rates, and relevance towards the topic, that is, the study regards IS success and its determinants. Applying these criteria, a study was incorporated if (a) the study either contains an IS success model and is highly cited[2] or (b) the study tests one or more IS success models and/or is highly cited and contains a meta-analysis. This selection procedure was followed to enable the inclusion of a sample of studies that are representative for the field for this study's purpose; the inquiry into convergence of IS success. Under the assumption that knowledge of a scientific field accumulates over time, only works published in the past 16 years are incorporated. Taking the interdisciplinary orientation of IS success research into account, the ABI INFORM and JSTOR databases were queried using the following key words and their combinations: information, system, evaluation, effectiveness, success, satisfaction, and use, to arrive at a first set of publications from which to select a set of landmark studies. All paper abstracts were scanned for relevance, keeping in mind the selection heuristics explicated above.

2 Highly cited: more than 100 times in the databases specified.

B. Assessment of literature

The assessment of literature was directed at providing a systematic insight into to what extent IS success research has converged between 1992 and 2008. To determine this, the constructs proposed in IS research were researched. For the inquiry into convergence of IS success, an analytical distinction was made between constructs representing IS success (as a dependent variable) and constructs predicting this success (as independent variables). This distinction enabled inquiry into convergence for the variable of importance here; IS success. A variable was labelled as a success measure if, in the individual study the author had done this him/herself, or the definition or items comprising the variable contained a judgment either about an IS or an aspect of the IS.

The analysis of IS success and its predictors was conducted as follows. Firstly and secondly, both the definitions of the constructs and the items with which the constructs were empirically measured were compared. This was done to make clear the degree of overlap that exists among constructs, regarding the intended meaning the constructs represent. Thirdly, the theories underlying the (success) constructs were identified. Inquiring the underlying theories seemed to be reasonable to do because the use of a particular theory explains the theoretical mechanism that relates a certain predictor with IS success. Furthermore, these theories were expected to be a major explanatory factor in deciding whether a construct could count as predictor or success construct and if opposing interpretations of the same theories occurred this could be easily detected.

While initially splitting up success constructs from predictors for success, it became apparent that for some constructs there was almost an equally distributed support (across studies) for the construct being a predictor or a success measure. For those variables a third category was introduced: a mixed-results category. Whether a criterion is placed in this category, depends on how uniform the label was referred to as either a predictor or success measure. The decisive criterion thus was uniformity. If more than 80 percent of the studies discussed the criterion in the same way, that is either success or predictor, it was subsequently categorized as such. If uniformity in response was less than 80 percent, the criterion was placed in the mixed-results category emphasizing that results are open to doubt.

To answer our research question, whether and to what extent convergence had occurred both convergence, as well as the set of heuristics for the inquiry into convergence have to be defined. Convergence is for the purpose of this study defined as the process in a field moving to uniformity regarding what comprises and causes success. Convergence on IS success measurement occurs when success is conceptualized with considerably less subdimensions over time, that is becoming more uniform reflecting a common view on matters. Demonstrable

evidence for convergence on what comprises success had to come from a comparison against some benchmark. In this study, the benchmark was provided by an observation made by DeLone and McLean. In 1992, having reviewed over 180 studies, they observed that the IS field encompassed nearly as much success measures as studies. A comparison between the number of different success constructs found in this study's sample and the benchmark, serves as an indicator whether and to what extent convergence has occurred between 1992 and 2008. Convergence on the predictors for success occurred when (a) there are considerably less relationships over time, and relationships between predictor and IS success are both (b) robust (same findings in different contexts) and (c) unambiguous (findings point in the same direction). Triangulation of method (qualitative and quantitative) and contexts of application strengthens the robustness indicator as well as the number of dimensions of success the predictors touch upon. Ambiguity could be observed by explicating opposing relationships across studies. It was hard to establish a benchmark for predictors of success, since the dependent variable was measured in nearly 180 ways in 1992. Therefore, a shortlist encompassing a number of unambiguous and robust relationships between predictor and success would provide a first indication of convergence. Furthermore, if a predictor touched upon multiple dimensions of success it proved to be convincing.

Exploring the convergence with the criteria proposed above necessarily encompassed a high level of abstraction because after initial selection of literature, meta-studies were found to be the main objects of observation and not empirical studies. Criteria such as organizational goals, goals of the IS, type of system, type of organization and organizational subdivision could not be incorporated in the study. This information was 'lost' in the meta-studies. However, more importantly, this information was not required to provide a general picture of the amount of convergence that has occurred in the object of analysis: IS success research.

4. RESULTS

This section concentrates on landmark IS success studies dealing with the measurement of success and is aimed at providing an overview of success constructs and constructs influencing success in IS success research. To reach the aim, a literature study was performed as was described in the previous section on methodology. The search protocol as described in methodology led to the incorporation of thirteen landmark IS success studies published in-between 1992-2008. For an overview and description of this sample, see Appendix 2.1. Keeping close to this section's aim, the results of the analysis are grouped in: (a) success constructs, (b) constructs that are faced with mixed results and lastly (c) constructs which predict IS success. The constructs showing mixed-results are presented in a separate section: the so-

called mixed results section. This study encompasses a total amount of 81 different construct labels, of which 43 are labelled in a unique way, as is subdivided for each construct category in Table 2.3. Of those 80 constructs 52 constructs were accompanied with a definition and for only 32 constructs an explicit reference was made to its empirical measurement. Most success constructs were defined however (35 out of 40) and almost half of all predictors for success (9 out of 22).

Table 2.3 Descriptive statistics for IS constructs in research sample

Construct category	Number of constructs	Number of different construct labels	Number of constructs with explicated definition	Number of constructs with explicated items
Success	40	11	35	12
Predictor	22	20	9	12
Mixed results	18	11	8	8
Total	80	43	52	32

In the next three sections, first the aggregated results for the categories success, predictor and mixed-results are presented. These aggregated results are reported in Tables 2.4, 2.6 and 2.8.

Next, the individual constructs are explored in more detail. This means that for each construct in this study's sample, the supporting studies, definitions and theoretical background are documented, which are presented in the Tables 2.5, 2.7 and 2.9. The most eye-catching findings considering success-, predictor & mixed-results constructs are briefly discussed in the texts below.

Table 2.4 IS success measures present in sample (count = total amount of occurrences across studies)

Success constructs	Number of occurrences	Relative contribution	Cumulative relative contribution
Net benefits	10	25%	25%
User satisfaction	8	20%	45%
System quality	7	18%	63%
Use	6	15%	78%
Information quality	6	15%	93%
Service quality	2	5%	98%
Utilization	1	3%	100%

Table 2.5 Success constructs across studies

Success construct	Supported studies	Definition(s)	Theoretically informed by
Individual & organizational impact	DeLone et al., 1992	Individual impact: the effect of information on the behavior of a receipt Organizational impact: the effect of information on organizational impact	Prior empirical work & taxonomies (Mason, 1978; Shannon & Weaver,1949)
	Hwang et al., 1999	Same as DeLone & McLean (1992)	D&M IS success 1
Net benefits	Seddon, 1997	An idealized comprehensive measure of the sum of all past and expected future benefits, less all past and expected future costs, attributed to the use of an information technology application. Any use of resources is a cost. (Seddon, 1997:246)	D&M IS success 2, 3
	DeLone et al., 2003; Petter et al., 2008	Capturing the balance between positive and negative impacts of the system towards the organization and its users (DeLone & Mclean, 2003:19)	ET Model
User satisfaction	DeLone et al., 1992; Rai et al., 2002; DeLone et al., 2003; Petter et al., 2008	The degree of user satisfaction with the system	Prior empirical work; no reference to theory
	Hwang et al., 1999	The receipt response to the use of the product of an information system (Hwang et al., 1999:230)	No explicit references
	Sabherwal et al., 2006	The extent to which the user believes that the system meets his or her information requirements (Sabherwal et al., 2006:1851)	No explicit references
Use	DeLone et al., 1992; Hwang et al., 1999; DeLone et al., 2003; Petter et al., 2008	A recipient's consumption of the output of an information system	Prior empirical works
	Bokhari, 2005	Either the amount of effort expended interacting with an information system or, less frequently, as the number of reports or other information products generated by the information system per unit time (Bokhari, 2005:213)	TAM
	Sabherwal et al., 2006	The individual's behavior of, or effort put into, using the system	TAM, UTAUT

Utilization	Rai et al.,2002	The degree to which the use is dependent on the IS for execution of their tasks' (Rai et al., 2002:57)	Integration of IS use from S ISS & DM ISS1
Information quality	DeLone et al., 1992	The desired characteristics of the information product / product of information system	Prior empirical works
	Seddon, 1997	Is concerned with such issues as the relevance, timeliness, and accuracy of information generated by an information system. Not all applications of IT involve the production of information for decision-making (e.g., a word processor does not actually produce information) so information quality is not a measure that can be applied to all systems	No explicit references
	Hwang et al. 1999	The desired characteristics of the product of an information system	No explicit references
	Rai et al., 2002	The degree to which information produced has the attributes of content, accuracy, and format required by user	No explicit references
	DeLone et al., 2003	The quality of the information system output	No explicit references
	Petter et al., 2008	The quality of the information system output	No explicit references
System quality	DeLone et al., 1992; Hwang et al., 1999; DeLone et al., 2003; Petter et al., 2008	Measures of the information processing system itself	Prior empirical works
	Seddon, 1997	Is concerned with whether or not there are 'bugs' in the system, the consistency of the user interface, ease of use, quality of documentation, and sometimes, quality and maintainability of the program code	No explicit references
	Sabherwal et al., 2006	The quality of the system in terms of reliability, ease of use, and response time	No explicit references
Service quality	DeLone et al., 2003; Petter et al., 2008	The overall support delivered by the service provider	Empirical observation

A. IS success

Success of an IS in this study comprises seven[3] constructs, five constructs return in multiple occasions and across studies. This was the result of a comparison of definitions of 40 constructs across the studies reviewed in this study. The categories are: net benefits, user satisfaction, system quality, use, information quality, service quality, and perceived usefulness which are presented in Table 2.4. The first five constructs, in Table 2.4, clearly take a lion's share (93%) of how IS success is defined in the literature. That being net benefits, user satisfaction, system quality, use and information quality. A first observation is that all success constructs comprise categories of DeLone and McLean's IS success model, as can be seen in Table 2.2; rows 3, 5 and 7. A closer examination of the IS success constructs is needed. Table 2.5, contains a detailed description for each construct's: supporting study, definition(s), underlying theories and core constructs. What does this table tell us? First, the different definitions used for a single construct all show a large degree of overlap. Secondly, there is a great reliance on DeLone and McLean's IS success model as can be seen in the column supported studies. Furthermore, for a relatively large degree of constructs there is no explicit reference made in the studies towards a specific theory; think for example of information- and system quality. Let us now take a closer look at the most highly referenced success measures: net benefits, user satisfaction, use, system-, information- and service quality.

Net Benefits, introduced by Seddon (1997) and DeLone and McLean (DeLone & McLean, 2003) can be defined as: "An idealized comprehensive measure of the sum of all past and expected future benefits, less all past and expected future costs, attributed to the use of an information technology application. Any use of resources is a cost" (Seddon, 1997:246) and is a successor of the individual- and organizational impact measures.

To stay close with the inventors (DeLone & McLean, 1992; Seddon, 1997; DeLone & McLean, 2003) of the three constructs, the decision was made to group all three constructs into one success category; net benefits, which after all is proposed by DeLone and McLean as the successor of individual and organizational impact. Net benefits is referred to as a success construct in 10 out of 13 studies. The net benefits construct was proposed to reduce an ever-increasing number of measures concerning the measurement of benefits (DeLone & McLean, 2003). Measures of net benefits regard a wide variety of groups and individuals, such as: benefits for designer, sponsor, different kinds of user groups or impacts on an interorganizational-, industry-, consumer- and societal level. In this study's sample, this measure is not associated

3 The reduction regarding the initial number of 11 different constructs in Table 2.3 and seven constructs reported here is due to a) grouping of constructs (such as: net benefits comprises both individual - and (b?) organizational impact, use comprises both use and system use etc)

with a specific theory. Following DeLone and McLean, this absence of theory can be explained because this measure serves to facilitate the much needed freedom to tailor the IS success model to the context. This tailoring was considered necessary because DeLone and McLean argued benefits from using an IS cannot be defined without a frame of reference or context (DeLone & McLean, 2003), or without adapting to a certain stakeholder group (Seddon, 1997). In the latest applications of the concept (Petter et al., 2008) net benefits are measured by means of perceived usefulness, which in other studies is referred to as a IS success construct on its own (Mahmood et al., 2000; Rai et al., 2002; Sabherwal et al., 2006). Seddon (1997) explicitly remarked that perceived usefulness is not the same concept as net benefits, because costs are in usefulness of less relevance. This remark has not been followed-up in recent research. For further discussions on perceived usefulness construct see the mixed results section, since support for this construct, being either a predictor or a success measure is equivocal.

User satisfaction is used as a success measure in eight studies. Although extensively used, the satisfaction construct in the studies reviewed here has poor theoretical foundations (Melone, 1990), see section 2 for a more comprehensive elaboration. DeLone and McLean (DeLone & McLean, 1992) made a three-fold argument in favour of satisfaction as a key success measure. For DeLone and McLean satisfaction a) has a high degree of face validity, b) can be measured with reliable tooling (Bailey & Pearson, 1983; Ives & Olson, 1984) and c) it is not as poor as other measures that are often conceptually weak or difficult to obtain. Seddon (1997) also made a strong case for satisfaction as a success measure. In Seddon's success model, all success measures are hypothesized to impact satisfaction, while satisfaction affects none. Seddon emphasizes the importance of this success measure among other success measures by stating that 'user satisfaction is probably the closest in meaning to the ideal net benefits measure' (1997:246). Sabherwal et al. (2006), however, advise not to direct all attention to the satisfaction construct after finding no significant relationship between satisfaction and use in their study. Rather, improving factors that lead to better quality systems would enhance multiple success measures, not only satisfaction. Petter et al. (2008) make a similar remark.

They argue that although a user's satisfaction is a goal in itself with regard to many ISs, satisfaction must not be the sole indicator for success. Several studies have found that self-reported measures differ from objective measures (Heo & Han, 2001); this means that subjective measures, as satisfaction, are not always a very reliable substitute for objective measures of success (Petter et al., 2008).

Use is a success measure that received more debate than the satisfaction construct. The construct is embedded in the theoretical constructs of system use (IS success models) and usage (TAM; UTAUT). Six studies refer to this construct as a success measure; one study puts forward that

use cannot be part of or equate IS success. This critical voice comes from Seddon (1997). Seddon substantiates his view on use with two arguments. Firstly, not use in itself proxies success but the benefits that flow from using a system. Secondly, use, which is most often operationalized as an activity, belongs in a process model and not in a variance model which serves to explain IS success (Seddon, 1997). Although Seddon made a sensible argument that DeLone and McLean's IS success model was conceptually messy, this has not been followed-up since the study of Petter et al. (2008). Petter et al. react to the criticism placed on the use construct by stating that 'the measure of system use has been over simplified; ignored when use is mandatory and poorly measured as merely frequency or time of use when voluntary' (2008:257). They state never to omit use from a study until empirical results provide a strong case to do so, that is in those cases that use encompasses little or no explanatory value.

Information quality is labelled a success construct in six studies. Only the study of Wixom and Todd (2005), integrating DeLone and McLean's success model with acceptance literature, conceptualizes information quality as a predictor for success. The theoretical basis for information quality being a success measure can be brought back to the IS success model proposed by DeLone and McLean (1992). Although central, the support for this construct being a success measure exclusively comes from studies proliferating success models. Acceptance oriented literature does not refer to this concept neither as a predictor nor as a success measure, see section 2 for an overview of the literature. Although definitions for information quality are alike (all are emphasizing the quality or characteristics of the output of an IS) the measurement of this construct is not highly standardized. An explanation for this is that relevant items to measure information quality with rely greatly on the context in which the information is required.

System quality is another central concept in IS success research, seven studies refer to this construct. As with information quality, there is one study (Wixom & Todd, 2005) conceptualizing it as a predictor for success. Although the definition of system quality is uniform, it can comprise various items, which depend greatly on the context and the system being evaluated, as was the case with information quality and net benefits. The support for system quality as a success measure comes solely from success models e.g. DeLone and McLean's IS success model. There is a substantial amount of studies emphasizing ease of use being a system's quality as well. While others, following a technology acceptance type of reasoning, view ease of use itself as either a success measure (Rai et al., 2002) or predictor (Mahmood et al., 2000; Ma & Liu, 2003; Wixom & Todd, 2005; King & He, 2006). This theoretical discussion continues in the mixed results section, when discussing ease of use.

The final success measure to be discussed is service quality. Service quality is a recent addition to the IS success models ((Seddon, 1997; DeLone & McLean, 2003). After Pitt et al. (1995)

and Seddon (1997) made an argument for this construct in their studies, DeLone and McLean (2003) and later on Petter et al. (2008) deployed the success construct in their models. Especially the importance of this category in relation to e-commerce settings was emphasized. DeLone & McLean even state the overall success of an IS department, i.e. service quality, may become the most important IS success variable (DeLone & McLean, 2003).

B. Mixed-Results

Across a number of studies, the constructs of usefulness, ease of use, intention (to use) and attitude, were operationalized as both success construct & predictor for success or independent and dependent variable. These constructs are therefore grouped in a so-called mixed results category. A construct was placed in the mixed-results category if uniformity of a specific construct belonging to either the success or predictor category was less than 80% across studies in this sample. This decision rule provides an indication that thinking about usefulness, ease of use, intention and attitude as being either a success measure or a predictor has not settled yet. This is illustrated in Table 2.6.

Table 2.6 Constructs referred to as success measure and predictor in the sample

	Theoretical status		
Construct	Success	Predictor	Total occurrences
Usefulness	3	4	7
Ease of use	1	3	4
Intention (to use)	3	1	4
Attitude	1	2	3

Next the individual constructs will be discussed in more detail. For both the predictor and success perspectives of each construct; the supporting study, definition and theoretical background are summarized. Additionally, for the predictors also the predicted constructs are summarized. The individual constructs are discussed in more detail below.

Perceived usefulness and usefulness, both referring to the same measure are used together in seven studies, making it a highly used measure. There are however mixed results for usefulness or perceived usefulness being either a success measure (Seddon, 1997; Rai et al., 2002; Sabherwal, Jeyaraj et al., 2006) or a predictor (Mahmood et al., 2000; Ma & Liu, 2003; Wixom & Todd, 2005; King & He, 2006). All studies in which usefulness is deployed refer to roughly the same acceptance models (TAM, UTAUT) as can be seen in Table 2.7.

Table 2.7 Constructs with mixed results (both predictor and success measure across studies)

	Operationalisation as success measure			Operationalisation as predictor			
Construct	Supported studies	Definition(s)	Informed by	Supported studies	Definition(s)	Informed by	predictor for
Usefulness	Seddon, 1997	Is perceptual indicator of the degree to which the stakeholder believes that using a particular system has enhanced his or her job performance, or his or hers group or organizational performance	TRA, TPB, TAM, IDT,	Mahmood et al., 2000	No definition	UTAUT, TAM1 / TAM2	User satisfaction
	Rai et al., 2002	The degree to which the stakeholder believes that using a particular system has enhanced his or her job performance	TAM, ISs models	Ma et al., 2004	No definition	TAM1 / TAM2	Technology acceptance
	Sabherwal et al., 2006	The degree to which an individual believes that using the system enhances his or her productivity and job performance	TAM, ISs models, UTAUT	Wixom et al., 2005	No definition	TRA, TAM, UTAUT	Attitude
				King et al., 2006	No definition	TAM1 / TAM2	Behavioural intention

Intention	Wixom et al., 2005	An intention to using the system	TRA, TPB, TAM, UTAUT	Venkatesh et al., 2003	An individual's positive or negative feelings about performing the target behaviour	TRA, TPB, SCT, TAM, MPCU, MM, IDT, etc	Attitude toward using technology
	King et al., 2006	No definition	TAM				
Attitude	Venkatesh et al., 2003	ATAUT: attitude a user has to using technology	TRA, TPB, SCT, TAM, MPCU, MM, IDT, etc	Mahmood et al., 2000	User attitude: no definition	TAM	User satisfaction
				Wixom et al., 2005	Behavioural attitude: no definition	TRA, TAM, UTAUT	Intention
Ease of use	Rai et al., 2002	The degree to which the IS is easy to use	ISs models	Mahmood et al., 2000	No definition	TAM	User satisfaction
				Ma et al., 2004	No definition	TAM2	Technology acceptance
				Wixom et al., 2005	The degree to which the system is easy to use	TRA, TAM, UTAUT	Attitude

The studies present in this sample do not provide a rationale explaining the theoretical mechanism in detail. It is therefore difficult to find a clear answer to the origin of the two, seemingly opposing, interpretations of acceptance literature. However, from Table 2.7, a pattern can be observed; the studies operationalizing usefulness as a success measure are multidimensional success models, whereas for the studies advocating usefulness as a predictor, success is one-dimensional; either determined by user satisfaction (Mahmood et al., 2000) or by acceptance/use (Ma & Liu, 2003; Wixom & Todd, 2005; King & He, 2006), this will be discussed in the discussion section. Although the status of the concept is not clear the concept is quite uniformly defined as: 'a perceptual indicator of the degree to which the stakeholder or user believes that using a particular system has enhanced his or her job performance (or his or her group's or organization's performance)' (Seddon, 1997:246). Furthermore, it seems that usefulness has a high degree of overlap with net benefits, a success measure discussed in a previous section; for Seddon (1997) however both definitions can be seen as two different constructs. Seddon (1997) located the difference between both constructs by noting that costs are not relevant in usefulness, as becomes clear when contrasting the definition of usefulness in Table 2.1, row 5 discussing TAM, with the definitions of net benefits in Table 2.5, row 2.

Ease of use is (Petter et al., 2008) used in 4 studies. Whether ease of use is a system's quality, a predictor or a success measure itself or even a system's quality remains open for discussion. However in this study's sample ease of use as a system's quality seems to be preferred (DeLone & McLean, 1992; Seddon, 1997; DeLone & McLean, 2003; Sabherwal et al., 2006; Petter et al., 2008). Rai et al. (2002), operationalizing ease of use from success models (DeLone & McLean, 1992; Seddon, 1997), regard ease of use as a success measure. Lastly, acceptance oriented studies clearly regard it as a predictor (Mahmood et al., 2000; Ma & Liu, 2003; Wixom & Todd, 2005). An observation, which will be discussed upon later, is that the theoretical status of ease of use corresponds with the various underlying theoretical mechanisms, which are described in Table 2.1.

Intention to use is referred to in three studies, two refer to intention as a success measure (Wixom & Todd, 2005; King & He, 2006) and one (Venkatesh et al., 2003) as a predictor for success. The main theoretical dispute underlying this difference in theoretical status of the intention construct is whether intention determines attitude (Venkatesh et al., 2003) or attitude determines intention (Wixom & Todd, 2005; King & He, 2006). For King et al. (2006) sticking to the 'core' of TAM, behavioural intention is the dependent variable. While King et al. limit their meta-analysis to intention as the dependent variable, they acknowledge the recent modification to TAM by summarizing scholars (Davis et al., 1989; Szajna, 1996; Horton et al., 2001; Moon & Kim, 2003; Petter et al., 2008) who theorize on the consequences of intention; for instance the effect intention has on (behavioural) attitude. Despite differences regarding the theoretical

mechanisms relating intention to IS success, both Wixom et al. and Venkatesh et al.'s definitions relate to the same construct because both refer to the intention to perform the target behaviour.

Lastly, attitude towards using technology and behavioural attitude are used in three studies. Attitude towards using technology and behavioural attitude refer to the same meaning: the attitude a user has to using a certain technology (2003). The theoretical status of the construct is referred to as both success measure' (Venkatesh et al., 2003) and predictor (Mahmood et al., 2000; Wixom & Todd, 2005). The construct originates from technology acceptance literature (TAM, TRA). Building on these and other acceptance models Venkatesh et al. proposed that attitude (towards using technology) is the dependent variable in their unified theory for the acceptance of technology (UTAUT), as can been seen in Table 2.1. In two other studies attitude was found to predict IS success. In those studies attitude, affect predicted the success measures; satisfaction (Mahmood et al., 2000) and behavioural intention (Wixom & Todd, 2005). Although Mahmood makes a reference towards TAM to explain the relation between attitude and satisfaction the theoretical mechanism is not explicated and therefore remains unclear. For Wixom et al., the relation between attitude and intention relies on the same interpretation of TAM (intention affects attitude) as was described above when discussing intention.

C. Predictors & their relationship with IS success

Seven out of thirteen studies in this sample propose predictors for one or more of the success constructs discussed above. Five studies in this study's sample solely discuss success measures. Fourteen[4] different predictors are proposed of which twelve relate to one or more success measures. Table 2.8 provides an overview of all predictors present in this sample. It displays a) the subsequent (type of) relationships with one or more success constructs, b) the individual study confirming/rejecting this relationship and lastly, c) following a distinction made by Sabherwal (2006), the predictors are categorized in context- and user related constructs. A further remark when reading this table is that especially the study by Sabherwal (2006) is a forceful meta-analysis encompassing 126 studies, all other studies encompass between 20 and 50 studies. Additionally, all relationships in the meta-studies in this sample are conceptualized and measured as positive-linear relationships, one study in this study's sample uses moderators (Venkatesh et al., 2003) while in another mediators are proposed (Sabherwal et al., 2006) to explain the relationship between predictor and success measures. What does this table tell us? From Table 2.8 the following observations can be made. Except for participation, relationships between predictor and success are not replicated and many relationships are

4 The reduction regarding the initial amount of 20 different constructs in Table 2.3 and 14 constructs reported here is due to a grouping of constructs.

Table 2.8 Predictors directly affecting success construct(s)

	Success measures in sample							
Predictors in sample	Net benefits	Use	User satisfaction	System quality	Information quality	Individual impact	Organizational impact	Service quality
Context related constructs								
Facilitating conditions		X(12) M(8) I(12)	I(12)	I(12)				
Organizational support			X(4)					
Top management support		X(12) I(12)	X(12) I(12)	O(12) I(12)	I(12)			
Perception of top management support			X (4)					
Social influence								
User related constructs								
Involvement			X(4) X(3)	X(3)	X(3)		X(3)	
Participation		X(3) O(12)	X(3,4,12)	X(3,12)	X(3)	X(3)	X(3)	
User expectations			X(4)					
Performance expectancy								
User training			I(12)	X(12)				
Experience		X(12)	X(4)					
User skills			X(4)					
Age								
Effort expectancy								

X = one meta-study confirming a positive-linear relationship
O = one meta-study rejecting a direct relationship
I = indirect effect, mediated by third variable
M = effect moderated by third variable

not researched; there are more empty cells in Table 2.2 than filled cells. Moreover, one relationship (participation-use) that is replicated shows contradicting results. Before moving to the individual results it has to be noted that for the IS success constructs net benefits and service quality, there was no relationship found between any of the predictors for success and both success constructs. Table 2.9 provides an overview of all predictors present in this study. For each predictor it is indicated: supporting authors, the definitions, the impact the predictor has on success and lastly the theoretical background (both in terms of theory and theoretical construct). Below, the most influential[5] constructs are discussed individually.

5 Constructs that affect either multiple success constructs and/or encompasses triangulated relationships are discussed.

The relationship between participation and several success dimensions is, with 10 occurrences, the most highly researched in this study's sample. User participation predicts the success constructs: system quality (Hwang & Thorn, 1999; Sabherwal et al., 2006), user satisfaction (Hwang & Thorn, 1999; Mahmood et al., 2000; Sabherwal et al., 2006), use, information quality, individual- and organizational impact (Hwang and Thorn 1999). Although assumed, Sabherwal et al. did not find a statistically significant relationship between participation and use (Sabherwal et al., 2006). This result opposes Hwang and Thorn's (1999) findings who found medium support for most IS success measures in the IS success model proposed by DeLone and McLean, except for individual impact. User involvement has proven to be a valid predictor for user satisfaction (Hwang & Thorn, 1999; Mahmood et al., 2000) and system quality and organization impact (Hwang & Thorn, 1999). Sabherwal (2006) integrates both the participation and involvement concepts into one definition. From the definitions described in Table 2.9, one might conclude that this harms the original meanings of both definitions because involvement refers to a certain attitudinal response as a central element in the definition whereas for participation it is not attitude but actual behaviour that is the focus in the definition (Ajzen, 2005). Lastly, the relationships found between involvement/participation and IS success can be explained through ISs development literature (Sabherwal et al., 2006).

Top management support predicts IS success five times. It indirectly affects success measures such as system quality, user satisfaction and system use through facilitating conditions and user-related constructs, such as: user attitude, user experience, user training, and user participation. It might be the case that top management support is closely related to the construct of perceived top management support (Mahmood et al., 2000) however definitions and items are not present to contrast and compare both constructs. The theoretical mechanism to understand the relationship between top management support and IS success is derived from the ideas of social influence and subjective norm posed in TRA and TPB. Two studies refer to top management support as a predictor in this study's sample. In Mahmood's (2000) study, perceived attitude of top management has a positive-linear relationship with a user's satisfaction regarding the IS. Sabherwal et al. (2006) found a positive-linear relationship between top management support and use and user satisfaction. A relationship between top management support and system quality was found to be not supported.

Facilitating conditions also affect IS success in five ways, like top management support. The IS success constructs use, user satisfaction, and system quality are indirectly influenced by facilitating conditions. Facilitating conditions also have a direct effect on use (Sabherwal et al., 2006). In the study of Venkatesh, facilitating conditions influence both attitude toward using technology and use (Venkatesh et al., 2003). This relationship between facilitating conditions and use is mediated by age and experience. Lastly, facilitating conditions also indirectly affect

Table 2.9 Constructs predicting success

Predictor	Supported authors	Definition(s)	Impact on success	Theoretically informed by (theory; construct)
Participation	Hwang et al., 1999 (3)	The observable behavior of users during the development process of a system	Participation has a positive impact on: - system quality; - use; - satisfaction; - organizational impact	Prior empirical studies
	Mahmood et al., 2000 (4)	No definition	Participation has a positive impact on satisfaction	Prior empirical studies
	Sabherwal et al., 2006 (12)	The tasks and behaviors that users perform during the ISD process, or the users' psychological state of involvement in the project	There is positive relationship between user participation and: user satisfaction, system quality A relationship between participation and use could not be confirmed	Information system development literature; user participation and user involvement
Involvement	Hwang et al., 1999 (3)	A need based mental of psychological state of users toward a system and its development process	Involvement has a positive impact on: - system quality; - information quality; - organizational impact - user satisfaction	Prior empirical studies
	Mahmood et al., 2000 (4)	No definition	There is a positive relationship between user involvement in system development and end-user satisfaction	Prior empirical studies
Effort expectancy	Venkatesh et al., 2003 (8)	The degree of ease associated with the use of the system	Effort expectancy influences acceptance positively (UTAUT) through behavioral intention	TAM; perceives ease of use MPCU; complexity IDT; ease of use

Performance expectancy	Venkatesh et al., 2003 (8)	The degree to which an individual believes that using the system will help him or her to attain goals in job performance	Performance expectancy influences acceptance positively (UTAUT) through behavioral intention	TAM; perceived usefulness MM; extrinsic motivation MPCU; job-fit IDT; relative advantage SCT; outcome expectations
User expectations	Mahmood et al., 2000 (4)	No definition	There is a positive relationship between user expectations and end-user satisfaction	prior empirical studies
Facilitating conditions	Venkatesh et al., 2003 (8)	The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system	There is a positive relationship between facilitating conditions and acceptance (UTAUT), moderated by age and experience	TPB; perceived behavioral control MPCU; facilitating conditions IDT; compatibility
	Sabherwal et al., 2006 (12)	The processes and resources that facilitate an individual's ability to utilize ISs	Through user attitude; there is a positive relationship between facilitating: - user satisfaction; - use; - system quality	UTAUT; facilitating conditions TPB; perceived behavioral control IDT; compatibility
Organizational support	Mahmood et al., 2000 (4)	No definition	There is a positive relationship between organizational support and user satisfaction	Prior empirical studies
User training	Sabherwal et al., 2006 (12)	The extent to which an individual has been trained about ISs through courses, training, manuals, and so on	There is a positive relationship between user training and: - system quality; - user satisfaction mediated by user participation - perceived usefulness mediated by user participation	SCT; self-efficacy
Top management support	Sabherwal et al., 2006 (12)	Top-management support for, and favorable attitude toward, ISs in general	There is a positive relationship between top management support and: - perceived usefulness - system use - system quality and user satisfaction both mediated by user participation	TRA, TAM, TPB; subjective norm UTAUT; social influence

Table 2.9 continues on next page

Table 2.9 ***Continued***

Predictor	Supported authors	Definition(s)	Impact on success	Theoretically informed by (theory; construct)
Perceived attitude of top management	Mahmood et al., 2000 (4)	No definition	There is a positive relationship between perceived attitude of top management and user satisfaction	Prior empirical studies
Social influence	Venkatesh et al., 2003 (8)	The degree to which and individual perceives the important others believe he or she should use the new system	There is a positive relationship social influence and acceptance (UTAUT), moderated by gender, age, experience and voluntariness of use	TRA, TAM, TPB; subjective norm MPCU; social factors IDT; image
Experience	Mahmood et al., 2000 (4)	No definition	There is a positive relationship between number of years of personal experience with computers and user satisfaction	Prior empirical studies
	Sabherwal et al., 2006 (12)	The duration or level of an individual's prior use of computers and IS	There is a positive relationship between user experience and use	UTAUT; experience: UTAUT provides a theoretical explanation, in UTAUT however experience serves as a moderator not a predictor
System satisfaction	Wixom et al., 2005 (9)	A degree of favorableness with respect to the system and the mechanics of interaction	There is a positive relationship between system satisfaction and intention to use technology, mediated by usefulness and attitude	TRA; object based attitude
Information satisfaction	Wixom et al., 2005 (9)	A degree of favorableness with respect to the usefulness of the information it produces	There is a positive relationship between information satisfaction and intention to use technology, mediated by ease of use, usefulness and attitude	TRA; object based attitude

IS success through behavioural intention. In Sabherwal's study, facilitating conditions have a positive effect on user attitude and experience (Sabherwal et al., 2006), which in turn impacts one or more success measures, all indirect effects through multiple paths. The relationships found between facilitating conditions and IS success can be explained through TPB, IDT, UTAUT and MPCU.

User training is referred to as a predictor for IS success once, in the meta-analysis of Sabherwal (2006). Training has a positive effect on system quality. Mediated by user participation, training also positively influences a user's satisfaction and perceived usefulness (Sabherwal et al., 2006). The relationship between user training and IS success can be understood from the SCT construct of self efficacy as described earlier in Table 2.3.

User experience is referred to as a predictor in two studies. In Venkatesh (2003) both user experience and skills are operationalized as mediating variables between the predictors performance expectancy, effort expectancy, social influence, facilitating conditions, behavioral intention, facilitating conditions and the predicted attitude toward using technology. The unified theory for acceptance of technology underlies this mechanism. In the relationships put forward by Sabherwal et al. and Mahmood et al., no theory is referred to which explains the relationships studied. In addition, no items were put forward with which to measure user experience. Nonetheless, two significant relationships relate user experience with IS success; user experience positively influences both satisfaction (Mahmood et al., 2000) and use (Sabherwal et al., 2006).

Having presented the constructs that encompass and predict success across the studies in this sample, next a conclusion is drawn with regard to this study's research question: Has convergence in thinking about what comprises and causes IS success occurred since 1992?

5. CONCLUSION

In this section the conclusion will be drawn whether and to what extent convergence has occurred regarding what comprises and predicts IS success.

A. IS Success

This study made clear that there are substantial indications that thinking about IS success has converged since 1992. In 1992 DeLone and McLean stated that there were almost 180 measures of IS success. This study shows that this can be brought back to five constructs comprising IS success, which return both unambiguously and repeatedly across studies and

over time. Those five constructs are *net benefits, user satisfaction, system quality, information quality and use*. Those big five comprise 93% of what can be labelled a success construct in this study's sample. There was general support for net benefits, satisfaction and service quality being a success construct. Strong support, but not unanimously, is there for *use, information quality* and *system quality* being a success construct; these constructs were viewed as success constructs in the majority of studies and as predictors of success in just one study. Service quality, referred to in two cases, is the expected rising star and is likely to be the most prominent in the near future (DeLone & McLean, 2003). Multiple authors stressed the importance of tailoring IS success constructs towards context (Seddon, 1997; DeLone & McLean, 2003). This is especially the case for success constructs such as information quality, system quality, and net benefits because in those constructs the focal system specificities and context are embedded. This need for tailoring might hinder further convergence, at least on the level of measurement.

Furthermore, it can be concluded, that there was hardly any theoretical basis for almost all success constructs, proposed in the studies reviewed (see Table 2.5). This became apparent while exploring the theoretical background of the influential IS success model by DeLone and McLean (1992), which has been followed up by the studies by Seddon, Wixom and Todd, DeLone and McLean and Petter et al. This model is primarily based on a taxonomy (Shannon & Weaver, 1949; Mason, 1978) of IS success rather than on a theory. The use of taxonomy is not problematic when one just tries to understand the distinct, mutually exclusive, categories which comprise IS success. The IS success models proposed in Table 2.1 however go beyond that and propose relationships between the elements of success. When exploring relationships between constructs, a theory is needed which adds to the features of a taxonomy an explanation for the (assumed) relationships between those categories, which currently is lacking. Lastly lack of theory is also the case for the studies emphasizing satisfaction as the sole success measure. Although the construct is based on valid scales (Bailey & Pearson, 1983; Ives & Olson, 1984) in the research inquiring satisfaction and its determinants, there is hardly no reference to theories (Melone, 1990). Use, as the exception, is firmly based in TAM, TPB, TRA and IDT.

B. Mixed-results

For four constructs, the theoretical status has not been resolved yet. This is the case for *intention, ease of use, attitude* and *usefulness*. The need to introduce a "mixed results" category in this study is itself an argument that the field has not converged completely. The four constructs share having a reference to the technology acceptance literature (TAM/TRA). An interesting finding, which will be discussed below, is that there are different interpretations of TAM across

studies. This became especially apparent with the ease of use construct. Ease of use was operationalized as a system's quality in IS success model studies, a success construct in Rai et al.'s (2002) interpretation of IS success models, and a predictor for success as described in TAM & TAM2. Although disagreeing on theoretical status, scholars agreed upon the way to define the constructs to a large degree, as can be seen in Table 2.6.

C. Predictors & relationships with IS success

It is hard to evaluate whether convergence on factors predicting IS success has occurred for three reasons. First, except for the predictors participation and involvement relationships between predictor and success are not empirically confirmed more than once. Second, two relationships that are researched more than once show opposing results, and third many relationships are not researched in this study's sample; there are more empty cells in Table 2.2 than filled cells. Although it is hard to inquire convergence with the absence of a clear benchmark, still some modest indications for convergence can be observed as there is some sort of shortlist with context- and user related constructs affecting IS success. Moreover, some relationships are empirically confirmed more than once triangulated and most of them unambiguously. Lastly, multiple linkages are confirmed between involvement, participation, facilitating conditions and top management support on the one hand and IS success on the other. The nature of the relationship is nevertheless not always evident. To illustrate this; for the relationship between facilitating conditions and IS success a direct-, mediated- and moderated effect was found. Furthermore, a demonstrable high degree of overlap exists across the individual construct definitions across studies, as can be seen in Table 2.9.

D. Main conclusion: IS success and its determinants, a proposal for a new model

The above conclusions can be summarized in a proposal for a new model of IS success constructs and its context- and user related determinants, as displayed in Figure 2.2.

The novelty of this model lies in the choice to conceptualize IS success as a dependent variable and not as a multidimensional and interdependent construct as is preferred by the dominant IS success models. (DeLone & McLean, 1992; Seddon, 1997; DeLone & McLean, 2003; Wixom & Todd, 2005; Petter et al., 2008) Are those proxies for success applicable universally? There is not just one way of defining IS success, because this question can only be answered in the light of the context and the information system at hand. The indicators that can be used to empirically measure IS success can comprise one or more proxies as is proposed in Figure 2.2.

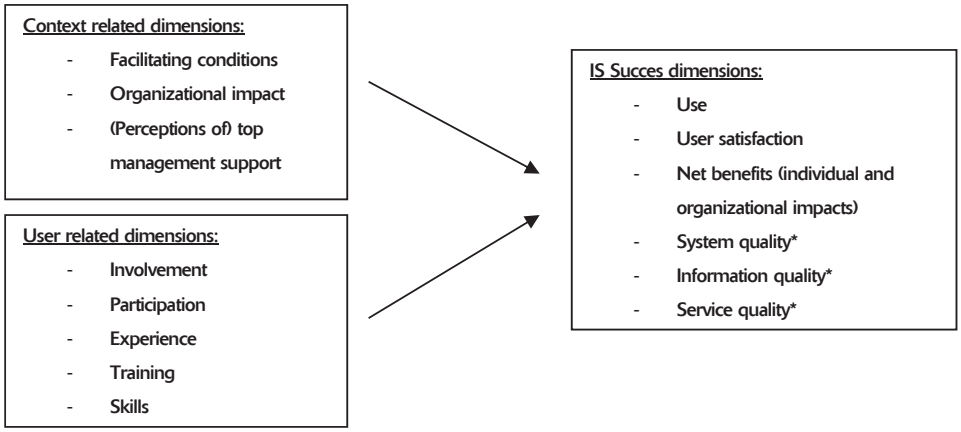


Figure 2.2 IS success and its determinants.

This also applies to the determinants for IS success, which also need to be carefully selected with regard to a specific context. A more detailed description of the empirical relationships found between predictor and success measure can be found in Table 2.8. Taking Figure 2.2 as a point of departure, further consequences for this way of conceptualizing both IS success and its determinants, will be discussed upon in the next section.[6] As will be explained below, this has general impacts for the way the IS success constructs are conceptualized and it has specific implications for information-, system- and service quality.

6. DISCUSSION

In this section, implications of this study for both theory and practice are discussed. This section will be concluded by this study's limitations.

A. Theoretical implications

In the introduction section, the question was posed: 'has convergence in IS success research occurred, ever since DeLone and McLean's observation that IS success encompasses nearly 180 success measures?' This observation was the result of an extensive meta-study by these authors. From this study they proposed an IS success model to provide guidance for future IS research. Since the observations by DeLone and McLean in 1992, that there are nearly

6 The success measures information quality, system quality and service can better be regarded as independent variable, mediator and/or moderator.

as much dependent variables as studies, a number of meta-studies has been conducted and subsequently models have been both proposed, and re-specified, all combining individual IS success constructs. Individually these studies, and the models proposed, did not provide the necessary bird's eye view to inquire convergence, because all depart from slightly different goals, theories and success models. As became apparent in this study, some studies underlined technology acceptance (Venkatesh et al., 2003; King & He, 2006). Others propagate one or two other IS success models (DeLone & McLean, 1992; Seddon, 1997; Rai et al., 2002; DeLone & McLean, 2003; Petter et al., 2008) because it is argued that IS success is multidimensional. However, another meta-study integrates use and satisfaction research (Wixom & Todd, 2005), constructs that are perceived as the two single most important IS success measures (Whittaker, 2001). These different orientations towards IS success, made it nearly impossible to provide the needed insight in the current state of convergence, regarding what comprises and causes IS success. Therefore, this paper was directed at analyzing if and if so, to what extent convergence can be observed regarding what comprises and causes IS success. Even with the multiple theoretical points of departure, this study showed that there are strong indications that thinking about what comprises and causes IS success has substantially converged, across studies and over time when compared with the 'pre 1992' era. Still, this does not dismiss us from the task progressing our understanding of this omnipresent phenomenon. Therefore, the following directions to guide future research will be discussed: (a) improving our theoretical understanding of IS success (b) improving construct validity, inquiring what causes success, (c) reconsidering the default use of linear relationships between constructs and lastly (d) exploring alternative lines of narrating IS success.

Improving theoretical understanding & integration of existing models

Although this study did not specifically emphasize the relationship(s) across success constructs, it became apparent there are multiple signals that IS success is regarded as both a multidimensional and interdependent construct (DeLone & McLean, 1992; Seddon, 1997; DeLone & McLean, 2003; Sabherwal et al., 2006; Petter et al., 2008). Petter et al., further state that: "until IS empirical studies consistently apply a validated, multidimensional success measure, is consistently applied the field will be plagued with inconsistent results and an inability to generalize its findings" (Petter et al., 2008:256). We agree with these scholars that the dependent variable in IS research can be regarded as multidimensional construct. We doubt however whether conceptualizing a dependent variable as being interdependent, as they propose, can be justified from a methodological view. Firstly, because the IS success construct is primarily based on two taxonomies (see conclusion section and Table 2.3), which are not suited for the inquiry of relationships. Secondly, because improving construct validity of IS success requires independent dimensions.

Furthermore, in empirical IS success studies, it becomes apparent that interdependent relations have led to a number of unresolved situations, for example the unresolved relationship between the success constructs use and satisfaction. Deploying a compelling meta-analysis, Sabherwal et al. (2006) rejected the existence of a relationship between use and satisfaction. Nevertheless, Petter et al. (2008) found a moderate to high support for satisfaction positively affecting use. This finding contradicts Sabherwal et al.'s findings, while at the same time partially confirming DeLone and McLean's proposed reciprocal relationship between both success constructs. A theoretical grounding of the highly measured but meagerly theorized satisfaction construct in IS success research (Melone, 1990), and IS success models might help progress our understanding.

Another illustration of the problematic nature of IS success being conceptualized as multidimensional are the incorporation of the two quality constructs: information- and system quality and recently also the service quality construct. Although these qualities are predicted by some independent variables (Table 2.8), in the IS success models reviewed, these three qualities only predict other success measures and should therefore be regarded as either an independent, moderating or mediating variable.[7] This would also make the dependent variable a sparser construct, comprising: satisfaction, use and net benefits.

In sum, to progress the validity, and consequently our understanding of IS success, we suggest a strict separation between dimensions of the dependent variable (IS success) on the one hand, and the interdependent variables on the other.

Another entry to progress our theoretical understanding might be to further examine the integration of theories regarding the acceptance of technologies (Venkatesh et al., 2003; Wixom & Todd, 2005). This might resolve the opposing relationships we found across studies (Table 2.7), for the variables: ease of use, usefulness, attitude and intention; which are all constructs based on acceptance literature (Table 2.2). A compelling reason for the 'mixed-results' found across constructs is a different interpretation of the Technology acceptance model (TAM). This is most compelling with the attitude and intention relationship. IS scholars put forward three different viewpoints. (a) The extended TAM (Venkatesh et al., 2003; King & He, 2006) proposes that attitude is predicted by intention, while (b) some scholars stick to original TAM (Wixom & Todd, 2005; King & He, 2006) in which attitude is left outside the model, yet others (c) hypothesize that attitude as a 'behavioral attitude' affects intention. (Wixom & Todd, 2005).

7 By analogy; service- and information quality in IS success models hold the same relationship with the use construct as ease of use and usefulness hold, as independent variables, for the dependent variable of use in the Technology Acceptance Model.

Improving construct validity

While studying definitions and operationalisations of success constructs and their predictors, a number of invalid conceptualizations and operationalizations of constructs became known. The low levels of construct validity became apparent with the conceptualization and measurement of the attitude construct (Venkatesh et al., 2003; Wixom & Todd, 2005), but also with the integration of the participation and involvement constructs, as was noted earlier in this study (Sabherwal et al., 2006). Taking the attitude construct as an illustration, the work of Ajzen (2005) is used as the basis to explore the ambiguity this construct's operationalization faces in current research. Ajzen learns us that affect is, along with cognition and conation, one of the validated response categories of an individual's attitude (Ajzen, 2005). These so-called response categories compromise an age-old distinction between cognition, affect and conation already put forward by Plato (Allport, 1954; McGuire, 1969; Hilgard, 1980; Ajzen, 2005). According to Ajzen affect can be defined as 'a (verbal) expression of feelings (affect) toward the information system' (Ajzen, 2005:4), which encompasses the very essence of the way Venkatesh (Venkatesh et al., 2003) and Wixom and Todd (2005) treat the attitude construct. The subsequent empirical measurement was done using items that put emphasis on joy, elation, pleasure, depression, liking, disgust, displeasure or even hate, which all refer to the affective dimension of an individual's attitude. It can be concluded that both definitions and operationalisations put forward in the studies reviewed did not represent attitude, rather the studies represented affect only. Although Fishbein and Ajzen (1975) postulated about affect "… there is a widespread agreement that affect is the most essential part of attitude" (1975:11), this does not imply loosening on specificity and consistency about the use of concepts, definitions and its operationalisations. Affect as a specific response category, cannot be singled out to represent an individual's 'entire' attitude. What is especially surprising is that Venkatesh's and Wixom and Todd's work is rooted in the work of Ajzen and Fishbein as was discussed earlier in this paper (TRA, TPB). In the light of this observation, it is helpful for future research to overcome low validity levels by maximizing the exactitude with which we conceptualize and measure our constructs. As was illustrated here, taking a close look at the intended meaning of constructs in preceding theoretical perspectives might help to improve construct validity.

Inquiring what causes success

From this study, it can be concluded that further research into what causes IS success seems to be justified. Resolving ambiguous relations, such as the relationships between: participation & use, top management support & system quality, as well as the relationship between intention & attitude are all entries for future research. Furthermore, confirming the relationships across differing contexts might help improve robustness of the relationships between predictors and IS success constructs.

Exploring alternative lines of research

Besides refining the existing body of knowledge, it might also be helpful for the progression of the field to open up for alternative ways of assessing IS success. A promising option could be narrating, which could generate additional insights[8] (Franz & Robey, 1986; Bjorn-Andersen, 1988; Schultz & Hatch, 1996; Goles & Hirschheim, 2000). Opening up for new perspectives can help gain (re)new(ed) understanding of what criteria matter in an IS evaluation. A way of exploring alternative lines of narrating IS success is by deconstructing current IS success models. When deploying a deconstruction a scholar approaches IS success research as a narrative. As a narrative, IS success research can be also analyzed for what it does not tell or marginalizes. This alternative type of analysis enables the explication of ways to understanding and inquire IS success that are not emphasized in current research endeavors and hence can help find ways to resituate or redefine our conception of information system success (Boje, 2001; Boje, 2008). For example, locating and giving voice to so called "rebel voices" with regard to information systems utilization, can help progressing our understanding of the way organizational members perceive and (resist to) deploy information technology.

B. Practical implications

With this study it becomes apparent that there are several constructs from which the practitioner, i.e. evaluator and decision makers regarding a specific information system, can select and subsequently refine its evaluation criteria. Tailoring the set of criteria towards context (goals, etc) is essential, since no criterion is intrinsically better than another (DeLone & McLean, 1992). On first hand sight, a distinction between mandated and voluntary IS, made by Seddon (1997), seems to be useful for narrowing down the set of IS evaluation criteria, after all: In cases where use is mandated it seems to make no sense to apply the concept of use as an evaluation criterion. However, for the practitioner the theoretical argument against use as a success needs more nuance. In cases where IS use is mandatory, the extent of use of a system remains variable. Users of information technology can be quite inventive in finding workarounds not to use a system, think of the widespread use of MS excel sheets alongside mature planning systems.

As a form of evaluation, inquiring success does not only regard the selection of proper criteria, in this case the IS success measures and their determinants. It also regards a comparison between an explicated standard and the subsequently measured performance on the given

8 Critics state that a single focus on IS success measurement does not lead to substantial progress of the scientific field, because new applications only lead to refinements. (Bjorn-Andersen, 1988; Franz et al., 1986) The researcher's stance in this subject matter is less critical and builds on both/and reasoning (Schultz & Hatch, 1996; Goles & Hirschheim, 2000) to come to 'progress' of the scientific field.

criterion (Scriven, 1967; Scriven, 1980). The focus of IS success research is however primarily on the explication of relevant criteria and not on how to set a standard with which to evaluate. This might leave the practitioner with some open questions concerning how to judge a certain score for predictors and success constructs alike. In this light, it is recommended to practitioners to be critical about the linear reasoning that higher quality always leads to higher IS success. See for example marketing and e-commerce research (McKinney et al., 2002; Staples et al., 2002; Cheung & Lee, 2005). Moreover, following findings in marketing research (Anderson & Sullivan, 1993; Mittal et al., 1998), linear modeling between variables can easily be an underestimation for lower scores on a dependent variable and an overestimation for higher scores on the dependent variable.

C. Limitations

The limitations of this research center around the methodological choices made. Having compared 13 meta-studies the grouping of constructs across studies is unavoidably a bit coarse. The limitations of this research stress around: (a) the level of generality (b) the possibility of bias in mixed results (c) sensitivity for novel research. *The level of generality;* the indirect method of data collection through meta-studies and meta-analysis, might limit the possibility for detailed inquiry into interdependencies among (success) constructs, because it might be the case that context specific elements, such as type of system, -user and -use, are lost in most meta-studies and meta-analysis. The conclusions drawn from this analysis did however not necessitate a more refined picture about the exact amount of relationships found in all empirical studies published. *Sensitivity for novel research;* providing a general picture inevitably has implications for the sensitivity of very recent and single IS studies, which are often not widely agreed and therefore (not yet) tested upon in meta-studies. Take for example the recent application of (non-linear) marketing models in e-commerce, which was discussed in the above, but were not part of the analysis. *Possibility of bias;* it has to be remarked here that especially for those constructs with a smaller amount of occurrences (ease of use, intention, attitude) slight deviations across studies made the construct easily belong to the mixed-results category. This made the decision rule a conservative one, for the discovery of mixed results this could lead to biases. However for the purpose of this study this was not perceived as problematic because it would at the most lead to a slightly more conservative estimation, with regard to the actual amount of convergence that occurred in IS success research.

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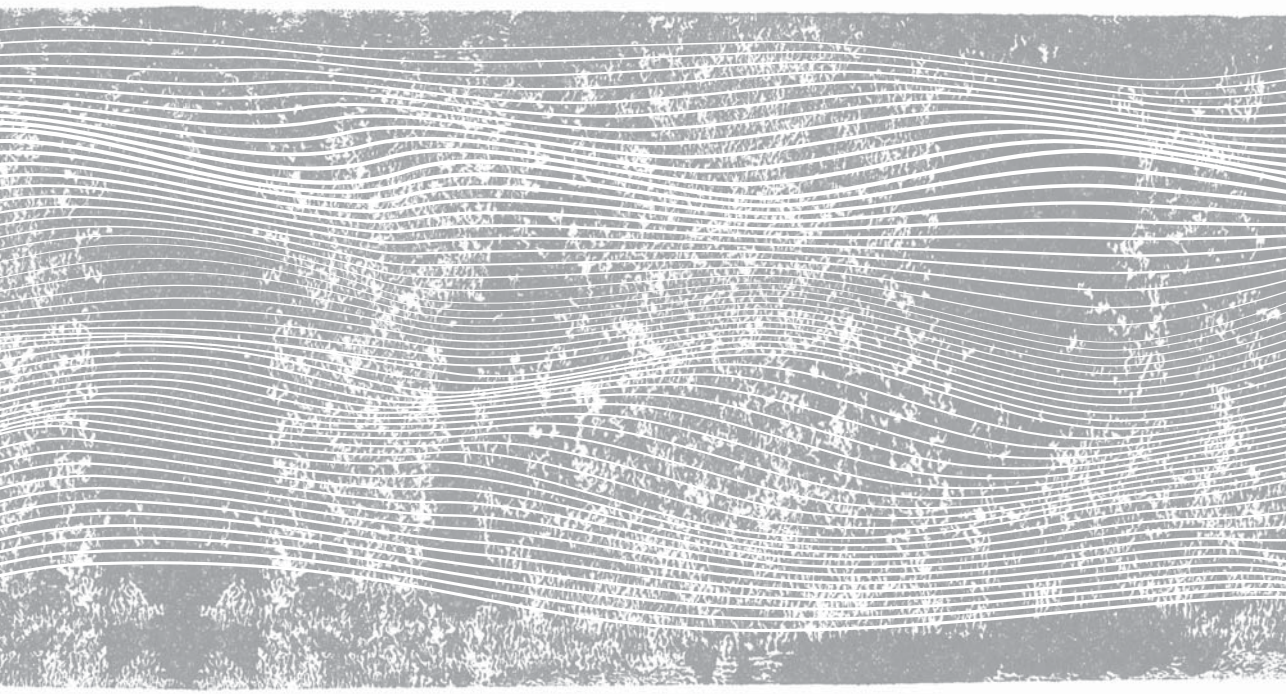
Appendix 2.1 Research sample

Authors	Year	Decription of study	Label
DeLone & McLean	1992	This is a qualitative meta study encompassing 80 empirical studies deployed in the seventies and eighties. An IS-success model is proposed from the studies, but not validated since its publication. This model has been used and tested more than 300 times.	1
Seddon	1997	In this study, a review of different information system success measures is presented. This author proposes a respecification and extension of the IS Success model of DeLone and McClean.	2
Hwang & Thorn	1999	This study is subjected to sort-out the inconsistencies that exist between user engagement and a system's success. Data from 25 studies executed prior to 1999 were meta-analyzed.	3
Mahmood	2000	A meta-analysis encompassing 45 studies between 1986 and 1998. This study is mainly aimed at testing variables effecting user satisfaction.	4
Rai, Lang, & Welker	2002	In this publication the authors empirically test both the DeLone and McLean model (DeLone et al., 1992) and Seddon's (1997) model in an empirical setting.	5
DeLone & McLean	2003	This article provides a 10 year update of the firstly developed IS-success model. Over 100 studies are reviewed in this study.	6
Ma & Liu	2003	This study presents a meta-analysis of 26 empirical studies deploying the technology acceptance model.	7
Venkatesh, Morris, Davis, & Davis	2003	This author presents and tests a unified theory for the acceptance of technology grounded in eight different theories that are empirically validated and used extensively. Subsequently, the explanatory power of the model proposed was tested against eight other models reviewed.	8
Wixom & Todd	2005	The main contribution is a theoretical integration of use and user satisfaction literature using Ajzen and Fishbein's (1980) distinction between object-based- and behavior attitudes.	9
Bokhari	2005	The study was subjected at better understanding the relationship between system use and user satisfaction as defined in DeLone and McLean's success model.	10
King & He	2006	Like Ma and Liu (2003) this study also presents a meta-analysis of the technology acceptance model, 88 studies are included.	11
Sabherwal, Jeyaraj, & Chowa	2006	Deployed a meta-analysis encompassing 121 empirical studies conducted between 1980-2004.	12
Petter, DeLone, & McLean	2008	Using the six dimensions of the D&M model – system quality, information quality, service quality, use, user satisfaction, and net benefits – 90 empirical studies were examined and the results summarized. Measures for the six success constructs are described and 15 pair wise associations between the success constructs are analyzed.	13

Chapter 3

Acceptance by the public of the virtual delivery of public services: the effect of affect[1]



[1] A modified version of this chapter appeared as: Hoefnagel, Oerlemans, Goedee (2012). Acceptance by the public of the virtual delivery of public services: the effect of affect. Social Science Computer Review, 30 (3), 274-296.

ABSTRACT

Little is known about the determinants of acceptance by the general public of virtual delivery of governmental services. We conduct an empirical study of the factors that influence the willingness of individuals to consent to a para-authentic virtual experience with a public sector employee as part of the delivery of a public service. Our study is based on the theory of social presence and on the Unified Theory for the Acceptance and Use of Technology (UTAUT). We test our hypotheses using 224 questionnaires completed by persons who have filed a police report using synchronous video-mediated communication (VMC). Our multiple regression analysis shows that four variables are likely to predict willingness to use virtual interaction as a part of the delivery of a public service: performance expectations, social presence, social influence and anxiety. Two findings were especially interesting. Firstly, affective predictors, as opposed to cognitive predictors, were found to be of increasing importance for the acceptance by the public of virtual service delivery. Secondly, social presence emerged as the strongest affective predictor. This study's empirical findings support our a-priori assumption that affective predictors, as opposed to cognitive predictors, are relatively more important in predicting the intention to use virtual technologies, when contrasted with conventional technologies.

1. INTRODUCTION

The use of virtual technology in the provision of public services is a relatively new phenomenon. While teleconferencing is common practice in business and academia and telemedicine has been widely used for decades (Cyr, Hassanein, Head, & Ivanov, 2007; Schrijver, 2008), few public service agencies interact to any meaningful extent with clients using virtual technology, and in many cases those that do are still experimenting with its parameters.[1] Technology acceptance models applied to a wide spectrum of non-service contexts have yielded valuable insights, and the technology acceptance literature has added to our understanding of how the general public responds to technology (Davis, Bagozzi, & Warshwa, 1989; Venkatesh, Michael, Gordon, & Fred, 2003), but we contend that acceptance by the public of virtual interaction in the provision of public services is somewhat different. Moreover there have been few empirical studies of the acceptance, or nonacceptance, of the use of virtual technology on the part of the general public. We intend to address these gaps.

According to social presence theory (Short, Williams, & Christie, 1976), acceptance of virtual technology depends on affective predictors, as well as the cognitive predictors of conventional acceptance models. One would expect affective factors to be especially important when technological media are used by agencies responsible for meeting basic human needs such as

welfare, health and safety (Hasenfeld & Abbott, 1992). Our goal in conducting this study is to determine what factors influence user acceptance of mediated communication in the delivery of public services. We do this by collecting empirical evidence of the relative importance of affective and cognitive predictors in explaining the acceptance of real-time video communication in the provision of a public service.

While much has been written on computer mediated communication (CMC), relatively few empirical studies have considered the delivery of services using video-mediated communication (VMC), and fewer still have attempted to determine what factors are likely to affect acceptance by the public of the use of such technology in the provision of public services. The remainder of this paper is structured as follows. In the next section we define virtuality, explain the context in which this study takes place, and evaluate synchronous VMC from the user's point of view. In the following section we briefly summarize different technology acceptance models and virtuality theories which we combine in building a theoretical model with which to empirically study acceptance of virtual technologies. We then outline our methodology, report our results, and present our conclusions. Finally, we address the implications of our findings for both researchers and practitioners.

2. VIRTUALITY, RESEARCH CONTEXT & TECHNOLOGY

Participating in a teleconference, watching television, even using a hearing aid are virtual experiences. According to Lee (2004:37): "Virtual experience is the sensory or nonsensory experience of virtual objects." He sees virtual experience as being in its own realm between real experience, that is, sensory experience of an actual object, on one hand, and hallucination, non-sensory experience of an imaginary object, on the other (Lee, 2004). The core construct in studies on virtuality, the present one included, is the concept of presence, basically, that the technology gives the user a sense of "being there" (Biocca & Harms, 2003; Lee, 2004). Considering the broad spectrum of technologies available today that can mentally transport us, make us feel like we are "there", it is not surprising that there are also many ways to conceptualize presence. To deal with these divergent views, Lee (2004:41) developed a typology of virtual experience. Our study can be positioned in the para-authentic/social dimension of that typology as graphically shown in Table 3.1, the domain in which the concept of social presence explains the perceived or actual quality of virtual mediating technology.

The concept of social presence was first proposed by Short et al. (1976) in their seminal book on the social psychology of telecommunications. According to their theory of social presence

Table 3.1 Adapted from Lee (2004:41)

Domains of virtual experience	Characteristics of virtuality	
	Para-authentic	Artificial
Physical	Experience of para-authentic objects Examples: directing telesurgery, watching television news	Experience of artificial objects Example: enjoying a historical battlefield within a computer game, reading non-fiction
Social	Experience of para-authentic social actors Example: videoconferencing, chatting over the internet	Experience of artificial social actors Example: responding to a telephone answering system
Self	Experience with para-authentic self Example: seeing oneself in a videoconference	Experience with artificial self(selves): adopting an identity in a role-playing game, identifying with a character in a movie

(TSP), social presence is the perceived quality of the communication medium, "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976:65). Sallnäs, Kassmus-Gröhn, and Sjöström (2000) would later write that the degree of social presence can be equated to the degree of awareness of the other party in a mediated communication. In other words, social presence has to do with a communicator's sense of awareness of the presence of another person, a partner with whom one can interact through a medium. That awareness is important in determining the way a communicator comes to think of the interlocutor, his or her characteristics, qualities and inner state (Short et al., 1976).[2] In Table 3.2 we consider the origins of some of the most influential definitions of social presence and ways in which it has been measured.

The definitions of Biocca (1997) and Lee (2004) have added breadth to our understanding of social presence, but for our purposes the earlier Short et al. (1976) definition is most applicable as it suggests a validated measure, and best describes the para-authentic/social dimension of the presence construct (Biocca & Harms, 2003; Gefen & Straub, 2004; Heerink, Krose, Evers, & Wielenga, 2008; Lee, 2004; Rice, 1992; Sallnäs, Kassmus-Gröhn, & Sjöström, 2000; Short et al., 1976; Steinfeld, 1986; Welmers, 2005). In sum, the quality of the virtual medium, and therewith the willingness to use the technology, is closely related to human communication constructs such as intimacy, humanness, warmth, and sociability. In the following sections, we consider further the relationship between the perceived quality of the virtual medium and its acceptance. First, however, we focus on the context in which we explored virtuality.

Table 3.2 Definitions of social presence

Definition	Source	Measures and origins
"The degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships."	Short, Williams, and Christie (1976)	Differential scale: cold-warm, sociable-unsociable, sensitive-insensitive and personal-impersonal Also operationalized as Likert scale (De Greef & IJsselsteijn, 2000). Definition is inspired by interpersonal communication literature involvement, intimacy (Argyle & Dean, 1965), and immediacy (Wiener & Mehrabian, 1968).
"The ability to make one's self known under conditions of low media richness."	Savicki and Kelley (2000)	Naturalistic assessment of communication style, think of: self-disclosure, opinion, fact, apology, question, call to action, challenge, reference to other group members, use of "we" language, argumentativeness, use of coarse language, attempts at conflict resolution, and indications of status.
"The minimum level of social presence occurs when users feel that a form, behaviour, or sensory experience indicates the presence of another intelligence. The amount of social presence is the degree to which a user feels access to the intelligence, intentions, and sensory impressions of another."	Biocca (1997)	Nowak (2000) operationalizes this definition by involving interpersonal communication literature constructs: involvement, intimacy (Argyle & Dean, 1965), and immediacy (Wiener & Mehrabian, 1968).
"A psychological state in which virtual (para-authentic or artificial) social actors are experienced as actual social actors in either sensory or non sensory way."	Lee (2004)	Based on Biocca & Harms (2003) and informed by own literature review and taxonomy.

2.1 Research context: the reporting of a crime

The taking of a report by the police is an example of a public service provided by a governmental agency. Tucker (1992:47) describes the provision of services of this kind as "a non-market form of organizing with indeterminate or ambiguous technology, which is mainly concerned with changing, constraining and/or supporting human behavior." Hasenfeld (1992), writing on human service organizations (HSO), points out that their clients expect them to embody values of caring, commitment, human welfare, trust and responsiveness to human needs. Despite the positive expectations that recipients of assistance from a HSO or from a public service agency may have, given the situation in which clients find themselves, it comes as no surprise that they may be fearful or feel victimized (Hasenfeld, 1992). The characteristics described by Hasenfeld (1992) are often seen during the process of filing a police report and thus can serve, as we will see, as a theoretical starting point for our research.

In the following section we describe further emotions that are often displayed by persons filing a police report, and describe the physical settings in which the police take reports. We also give the motivations for adopting the use of VMC in policing.

2.1.1 Conventional crime reporting

In most countries, a person who wants to report a crime goes to the police station closest to where the incident occurred. The way in which a report is taken in the Netherlands is very similar to how it is done in most of Europe. In the greater metropolitan area of Rotterdam in the Netherlands, traditionally most police reports have been taken by a police officer who meets with the person filing a report privately. While the filer and the officer are separated from one another by a desk, they are nonetheless face-to-face in close proximity to one another. The officer uses a text-based information system to create and store a document in which all of the pertinent information given by the filer is entered. In a study of public perceptions of the police in the Netherlands, researchers found that it is not uncommon for persons reporting a crime to express or show signs of anxiety or anger. Often they seem to be eager to share what they have experienced and want the officer to whom they are relating the incident to be friendly and a sympathetic listener who shows concern about what has happened (Ministry for Interior and Kingdom Relationships, 2005).

2.1.2 Virtual crime reporting

The way of taking police reports described above is costly. Each locale where a police report may be filed needs to be staffed with officers trained in handling the task and back up personnel, including armed police officers. Time devoted to the taking of police reports is not available for other functions, including crime prevention and investigation. It is not surprising that budgetary constraints have prompted consideration of alternative means of taking police reports. We look now at technology that allows the police to meet the needs of the public in a more cost-effective way.

Advances in information and communication technology (ICT), including improved holographic display and other audio-visual infrastructure, enables a reduction in the number of employees staffing police stations. One of the main advantages of virtual presence technology is that it can mean significant savings in labor costs without appreciably reducing the intensity and quality of human contact. Persons filing reports still have contact with a police officer, but in a virtual way. The officer's 3D image is projected on a screen with sufficient clarity to allow for making eye contact with the filer. This technology makes it possible for there to be one central facility at which crimes may be reported rather than at 24 different locales. The attendant considerable reduction in personnel, and to a lesser extent in facilities, has resulted in annual

savings of Euro 4.5 million. The one-time investment was Euro 3 million and the annual cost estimated at Euro 0.4 million, mostly for ICT (Politie Rotterdam-Rijnmond, 2010). In the next section we take a closer look at the technology used.

2.2 Enabling virtual crime reporting: video-mediated communication

Video-mediated communication (VMC) refers to technologies that enable humans to communicate mediated by a video signal (Finn, Sellen, & Wilbur, 1997). Video-meditated communication has been a topic of interest in both business and academia since its introduction in the 1960s. Although it has proven to be invaluable in a wide range of applications such as remote task collaboration, teleconferencing and long-distance learning (Finn et al., 1997), VMC technology has met with some resistance when face-to-face or co-present interaction is called for because a sense of real human contact has been lacking (see Egido, 1990 for a review of the possibilities and limitations of VMC). The influence of VMC technology has been studied from a communication process perspective (Cook & Lalljee, 1972; Doherty-Sneddon et al., 1997) and more recently from the perspective of users (Heerink et al., 2008; Schrijver, 2008; Welmers, 2005). We focus in this study on users, specifically on their acceptance of VMC technology in the delivery of public services.

It is apparent that VMC systems vary in terms of their ability to transmit audio and video in full-duplex so as to make eye-contact and same direction of gaze possible (Doherty-Sneddon et al., 1997; O'Connaill, Whittaker, & Wilbur, 1993). O'Conaill et al. (1993) found that broad-band communication delivers a richer, more face-to-face-like experience than small-band video-mediated communication. Broad-band technology provides high-quality video and does away with time lag problems, the result being more natural communication. Technological improvements have increased the use of VMC and broadened the array of applications. It is now possible to study VMC outside of high-tech and laboratory environments and to look at real-life situations in which VMC is in use, such as in the taking of a police report.

The system has two features not found on conventional webcam and teleconferencing systems. First, it allows for better eye contact, and second, it captures, to some extent, three dimensionality (3D). Argyle and Dean (1965) have confirmed that eye contact is an important part of gathering information from communication partners and thus an important feature in human interaction and communication. Most conventional videoconferencing systems and webcam solutions are not able to fulfill the need for eye contact and same direction of gaze because the video-capturing device is placed on top of the monitor or screen of the operator. The VMC studied enhances eye contact with a mirroring effect produced by a sloping glass

panel placed in front of the screen that picks up light and reflects it, similar to the mirrors of a periscope. The mirrors transport the objective of the video lens to right behind the eyes of the police officer's virtual image, projected on the sloping glass which is positioned in front of the citizen. This way of transporting the objective enables eye-contact, while the video camera itself is placed under the table at which the citizen is seated.

A number of features are used to create a 3D perception. The police officer is seated before a blue background. The blue emulsion layer of film has the finest crystals and blue is more complementary to most human skin tones, which is why a blue background is used in television studios. Real-time video enhancement makes it possible to separate the image of the police officer from the blue background. The video stream is captured in a video-codec, the data is transmitted through a data network to a dedicated place, the video-codec is encoded and the video stream is projected onto the sloping glass panel in real time.

3. ACCEPTANCE OF VIRTUAL TECHNOLOGIES: DEVELOPING A THEORETICAL FRAMEWORK

We present in this section our theoretical framework. Building on previous research on virtuality and on presence, we propose that acceptance of virtual technology in general, and of the use of such technology in the provision of public services in particular, relies more on affective than on cognitive predictors as may be the case with conventional technologies. We build our theoretical model in the following way: First, we provide an overview of conventional technology acceptance models, and the present affective/cognitive predictor's ratio in those models is explicated as a base line. We combine a technology acceptance model with social presence theory into a theoretical framework to study the central role that affective predictors play in the acceptance of virtual delivery of public services.

3.1 Conventional technology acceptance models

The efforts of scholars to determine how and why individuals adopt new technologies have resulted in a number of technology acceptance models. Drawing in part on Venkatesh et al.'s (2003) review of models of technology acceptance, we summarize eight of them, giving for each its author(s), fundamental premise(s), and core constructs. The theories that have most influenced these models are those of reasoned action (TRA) (Fishbein & Ajzen, 1975), planned behavior (TPB) (Ajzen, 1985, 1991) and innovation diffusion (IDT) (Rogers, 1983). None of these models alone can predict the acceptance of virtual technologies specifically. According

to social presence theory (SPT), the quality of a virtual technology depends on how well it evokes and/or carries affective responses in the user, that is, how well the technology transmit feelings, makes it possible to establish human contact (Short et al., 1976). This implies that to predict the acceptance of virtual technology, we must consider additional affective predictors as well as cognitive ones.

All of the models included in Table 3.3 share three main characteristics. First, they attempt to predict acceptance and use of a technology. Second, they see intention as a key predictor of these behaviors. Third, they stress cognitive and conative/intentional variables in predicting acceptance and use, consequently considerably fewer predictors, just 5 out of 30, are affective in nature (Ajzen, 2005). The last of these observations requires some clarification. Whether an individual has a favorable or unfavorable attitude toward a given technology is determined by that individual's cognitive, affective, and conative responses. Cognitive responses hinge on personal perceptions and beliefs, affective responses reflect emotions and feelings, and conative responses have to do with willingness, that is, expectations about one's own actions in the future (Ajzen, 2005; Short et al., 1976). Using definitions provided by Ajzen (2005) and Fishbein and Ajzen (1975), we indicate in Table 3.3 whether a given predictor is affective (A) or cognitive (C). This allows us to indicate the relative importance of affective predictors in the most influential models of technology acceptance, providing us with a baseline against which to measure if, and to what extent, the distribution between cognitive and affective predictors changes when predicting acceptance of virtual technologies, as opposed to conventional technologies.

The Unified Theory for the Acceptance and Use of Technology (UTAUT) best meets the requirements of this study as it emphasizes to the extent we want the importance of affective predictors in addition to other acceptance factors, and out of all the acceptance models, has the most predictive power (Venkatesh et al., 2003). The UTAUT has received considerable attention,[3] and has been empirically validated several times (Oshlyansky, Cairns, & Thimlebly, 2007; Pu Li & Kishore, 2006). Studies applying the UTAUT have considered far-ranging applications, from the use of video-telephony in caring for ALS patients and that of robots in providing companionship for older persons suffering from dementia, to internet radio quality (Heerink et al., 2008; Schrijver, 2008; Welmers, 2005).

The UTAUT combines a number of influential theories of the acceptance and use of technology (Venkatesh et al., 2003), building especially on planned behaviour and on technology acceptance models. These models maintain that attitudinal beliefs influence the intention to perform a certain act, which in turn influences actual behaviour. According to the UTAUT, it is the attitudinal beliefs of users and would-be users about performance and effort, as well as

Table 3.3 Overview of acceptance models

Theory/model (major contributor)	Fundamental premise	Core constructs
Theory of reasoned action [TRA] (Fishbein & Ajzen, 1975)	Individual behavior is driven by behavioral intentions which comprise attitude and social norm	Attitude towards behavior: 'an individual's positive or negative feelings (evaluative affect) about performing the target behavior' (Fishbein and Ajzen, 1975:216) (A) Subjective norm: 'the person's perception that most people who are important to him think he or she should or should not perform the target behavior in question' (Fishbein and Ajzen, 1975:302) (C)
Theory of planned behavior [TPB] (Ajzen, 1985; Ajzen, 1991)	Extension of TRA; perceived behavioral control is added to TRA as a predictor for individual behavior	Perceived behavioral control: 'the perceived ease of difficulty of performing the behavior' (Ajzen, 1991:188) in IS research; 'perceptions of internal and external constraints on behavior' (Taylor & Todd 1995) (C)
Innovation diffusion theory ([DT] (Rogers, 1983; Rogers, 1995; Moore & Benbasat,1991)	Individuals possess different degrees of willingness to adopt innovations	Relative advantage: 'the degree to which an innovation is perceived as being better than its precursor' (Moore & Benbasat, 1991:195) (C) Easy of use: 'the degree to which use of an innovation is perceived to enhance one's image or status in one's social system' (Moore, Benbasat, 1991:195) (C) Image: 'the degree to which one can see others using the system in the organization' (Moore, Benbasat, 1991:195) (C) Compatibility: 'the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adapters' (Moore, Benbasat, 1991:195) (C) results demonstrability: 'the tangibility of the results of using the innovation, including their Observability and communicability' (Moore, Benbasat, 1991:203) (C) Voluntariness of use: 'the degree to which use of the innovation is perceived as being voluntary, or of free will' (Moore, Benbasat, 1991:195) (C)
Technology acceptance model [TAM / TAM2] (Davis, 1989; Bagozzi et al., 1992)	When users are confronted with a new technology, a number of factors influence their decision about how and when they will use	Perceived usefulness: 'the degree to which a person believes that using a particular system would enhance his or her job performance' (Davis, 1989:320) (C) Perceived ease of use: 'the degree to which a person believes that using a particular system would be free of effort' (Davis, 1989:320) (C) Subjective norm: As in TRA (C)

Table 3.3 ***Continued***

Motivational model [MM] (Vallerand, 1997; Davis et al., 1992; Taylor & Todd, 1995)	Behavior can be motivated intrinsically or extrinsically	Extrinsic motivation: 'the perception that user will perform an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved job performance, pay, or promotions' (Davis et al, 1992:112) (C) Intrinsic motivation: 'the perception that users will want to perform an activity for no apparent reinforcement other than the process off performing the activity per se' (Davis et al. 1992:111) (C)
Model of PC utilization [MPCU (Triandis, 1977; Thompson, 1991)	Derived from Triandis' theory of human behavior (Triandis, 1977) Thompson (1991) argues that utilization is affected by social factors, affect, perceived consequences and facilitating conditions	Job-fit: 'the extent to which an individual believes that using (a technology can enhance the performance of his or her job' (Thompson et al., 1991:129) (C) Complexity: 'the degree to which an innovation is perceived as relatively difficult to understand and Use' (Thompson et al., 1991:128) (C) Long term consequences: 'outcomes that have a pay-off in the future' (Thompson et al., 1991:129) (C) Affect towards use: 'feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act' (Thompson et al., 1991:127) (A) Social factors: 'the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific situations' (Thompson et al., 1991:126) (C) Facilitating conditions: 'objective factors in the environment that observers agree make an act easy to accomplish' (Thompson et al., 1991:129) (C)
Social cognitive theory [SCT] (Bandura, 1986; Compeau & Higgins, 1995)	Human behavior is seen as an interaction of personal factors, behavior, and the environment	Outcome expectations performance: 'the performance-related consequences of the behavior' (Compeau & Higgins, 1995) (C) Outcome expectations personal: 'the personal consequences of the behavior' (Compeau & Higgins, 1995) (C) Self-efficacy: 'judgment's of one's ability to use a technology to accomplish a particular job or task' (C) Affect: 'an individual's liking for a particular behavior' (A) Anxiety: 'evoking anxious or emotional reactions when it comes to performing a behavior' (A)
Unified Theory for Acceptance of Technology [UTAUT] (Venkatesh et al., 2003)	Based on theories above, use behavior is determined by personal evaluations, personal attributes, social influence and facilitating conditions	Performance expectancy: 'the degree to which an individual believes that using the system will help him or her to attain gains in job performance' (Venkatesh et al. , 2003:447) Effort expectancy: 'the degree of ease associated with the use of the system' (Venkatesh et al., 2003:450) Attitude towards using technology: 'individual's overall affective reaction to using a system' (Venkatesh et al., 2003:455) (A) Behavioral intention to use the system: 'not defined' Facilitating conditions, anxiety, self efficacy & social influence: similar to MPCU

A= affective predictor, C= Cognitive predictor.

the influence of other social actors and facilitating conditions, that impact the intention to use a certain technology, and so actual use. In the original UTAUT model, these relationships are moderated by age, gender, voluntariness, and experience.

3.2 Explaining the acceptance of virtual technologies

In this section, we present our empirical model and define our variables. The model is shown in Figure 3.1, and the variables summarized in Table 3.4. We also summarize the UTAUT hypotheses in Table 3.5. We modify the original UTAUT model to meet our needs, deleting two variables and introducing an extension.

We extend the UTAUT model using elements of social presence theory (SPT). The public expects police officers to show concern and care about what has happened (MinIKR, 2005). The UTAUT does not take this expectation into consideration. However it is very important in our study as virtual technology can undermine the transmission of empathy, and hence the quality of the medium and its acceptance (Short et al., 1976; Venkatesh et al., 2003). The two UTAUT variables which we do not use are voluntariness of use, that is the degree to which use of the innovation is perceived as being voluntary (Moore & Benbasat, 1991:195), and use behaviour. Neither of these variables applies to our context as non-use of the technology is not an option. Consequently, there would be no variation in these variables (Seddon, 1997).

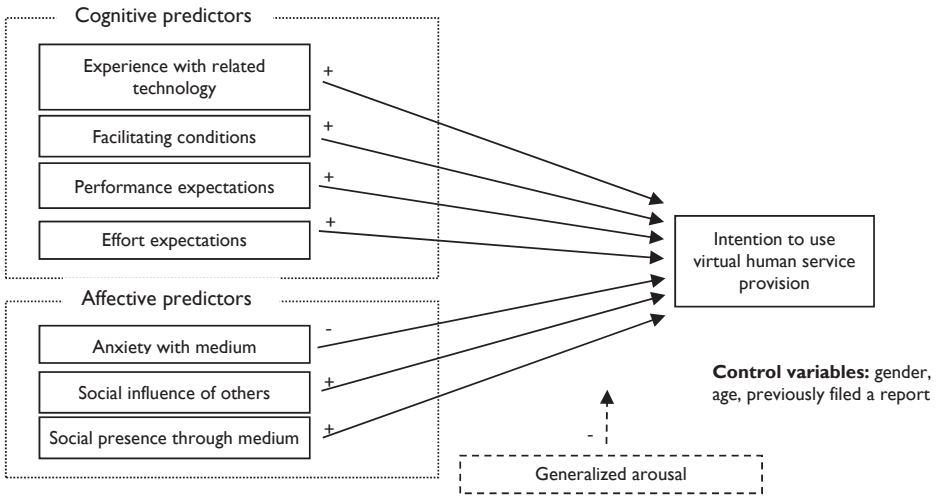


Figure 3.1 Empirical model for acceptance of the provision of public services virtually.

Table 3.4 Definitions of variables in UTAUT

Variable	Definition
Performance expectancy	"The degree to which an individual believes that using the system will help him or her to attain gains in job performance." (Venkatesh et al., 2003:447)
Effort expectancy	"The degree of ease associated with the use of the system." (Venkatesh et al., 2003:450)
Facilitating conditions	"Objective factors in the environment that observers agree make an act easy to accomplish." (Thompson, Higgins, & Howell, 1991:129)
Social influence	"The individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific situations." (Thompson et al., 1991:126)
Anxiety	Evoking anxiousness or emotional reactions when it comes to performing a task. (Compeau & Higgins, 1995)
Social presence	"The degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships." (Short et al., 1976:65)
Generalized arousal	The generalized feelings and emotions associated with the crime, and the perceived seriousness of the crime. (Greenberg & Beach, 2004)

Table 3.5 UTAUT Hypothesis predicting the dependent variable: intention to use technology in virtual public service provision

Independent variable	Direction	Theoretical mechanism
Effort expectations	+	The degree to which a technology is easy to get used to, positively relates to acceptance of that technology. Similar to the ease of use construct in Technology acceptance model (Davis et al., 1989).
Performance expectations	+	The degree to which a technology is perceived as useful positively relates to the acceptance of that technology. Similar to the usefulness construct in the technology acceptance model (Davis et al., 1989).
Social influence	+	Social influence has an impact on (intention to) use through three mechanisms: compliance, internalization, and identification (Venkatesh & Davis, 2000; Warshaw, 1980). The latter two relate to altering an individual's belief structure and/or causing an individual to respond to potential social status gains, the compliance mechanism causes an individual to comply with the social influence. Individuals are more likely to comply with others' expectations when those others have the ability to reward desired behavior and punish undesirable behavior (French & Raven, 1959; Warshaw, 1980).
Experience with related technology	+	More experienced users of technology accept new technologies easier then less experienced users of technology (Davis et al., 1989).
Facilitating conditions	+	Facilitating conditions includes aspects of the technological and/or organizational environment that are designed to remove (that is positively influence) barriers to use, such as the facilitating conditions in the model for PC utilization and compatibility in innovation diffusion theory (Rogers, 1983).
Anxiety with medium	-	Having fears about technology use, such as a fear of making mistakes or loss of data, results in low intention to use and eventually even to avoidance of use (Gilroy & Desai, 1986; Igbaria & Chakrabarti, 1990).

3.2.1 Additional affective hypothesis

We argue in this study, as does social presence theory, that affective responses are important in explaining attitudes about virtual technology and so subsequent use behavior. According to social presence theory, communication is more effective if the social presence qualities of the virtual system are appropriate in terms of the level of interpersonal involvement required for a task. We referred earlier to an empirical study of crime reporting in the Netherlands that found that affective qualifiers, like police officers being seen as friendly, are important to persons filing a police report. Social presence theory (SPT) measures warmth, sociability, sensitivity, and personableness. According to SPT, communications media vary in the degree to which users perceive social presence, and these variations are important in determining the medium individuals wish to use to interact with others (Short et al., 1976:65). The wish to interact can be seen as the SPT operationalization of the UTAUT's central conative concept, intention to use. SPT and the UTAUT share the same conation intention, the former stating it more specifically than the latter. This reasoning leads us to assume that when individuals perceive their interlocutor through VMC as warm and caring, i.e. having a high social presence level, they are more likely to intend to use services delivered virtually in the future. We hypothesize then that:

> *H1: The greater the perceived social presence of the communication medium, the greater the acceptance of virtual delivery of public services.*

It is reasonable to assume that individuals who are under significant emotional stress will require more reassurance than they might normally. Therefore, we can assume that the level of stress that may accompany the filing of a police report will lead to a need for a greater degree of social presence. If the technology is not able to provide that, one would expect a lower level of acceptance (Short et al., 1976). This has been confirmed by recent studies (Gefen & Straub, 2004; Straub & Karahanna, 1998). This means that persons filing a police report may not accept the use of video-mediated communication. While this has not been studied, it seems reasonable to conclude that the relationship between social presence and intention to use virtual delivery of services, as proposed in Hypothesis 1, would be negatively moderated by the state of mind of the person filing a police report, and that might well hinge on the type of incident being reported. According to Short et al., higher states of arousal may lead to avoiding use of the medium. This leads us to a second hypothesis:

> *H2: The relationship between perceived social presence and acceptance of technology is negatively moderated by high generalized arousal.*

4. METHODOLOGY

4.1 Design & sampling

We used a one shot, ex-post survey to gather data for our study of factors that influence the willingness of individuals to consent to a para-authentic virtual experience with a public sector employee as part of the delivery of a public service (Bauer, Gaskell, & Allum, 2000). We conducted our study at a local police station located in a multi-ethnic multi-cultural area of the major European port city of Rotterdam in the Netherlands. The Rotterdam metropolitan area, referred to as the Rotterdam-Rijnmond area, has a population of 1.2 million made up of 173 different nationalities.

There are 150,000 crimes reported each year at the 24 Rotterdam-Rijnmond area police stations. We gathered data over a two-month period, October and November 2009, during which time 224 persons completed questionnaires after filing a police report. Respondents were selected at random from a population of persons arriving at a police station to report a crime. Approximately 95 percent of the crime reports filed during the time window of this study were taken using virtual communication technology. The crimes reported ranged from the loss of important documents, passports for example, to serious crimes including burglary, robbery and assault. During that period, about 4 percent of reports were taken in person by a police officer with extensive training in handling crimes such as rape and domestic violence, and 1 percent of reports were taken where an incident took place.

As reports may be filed whenever a station is open to the public, our sample includes responses from persons who filed reports at various times of day. Once it was determined that a person arriving at the station intended to report a crime of the kind covered by our study, he or she was shown by a police officer to the door of a room in which the VMC system we described earlier had been installed. The person filing a report was told briefly about the way in which the report would be taken and then the door of the interview room was opened and the filer was invited to enter. Inside the torso and head of the police officer who will be taking the report was projected, i.e. those parts of the body normally seen above desktop level. The 'virtual police officer' invited the filer to sit down, spoke briefly about the design of the virtual setting, and in general engaged in casual conversation with the person who wished to file a report in order to make him or her feel comfortable. This introductory phase usually took just a few minutes, then the process of taking the report commenced.

4.2 Data collection and analysis

We collected our data using a questionnaire with validated scales (Greenberg & Beach, 2004; Short et al., 1976; Venkatesh et al., 2003). Each item was measured using a seven-point Likert-type scale (1 = 'totally disagree' to 7 = 'totally agree') translated into Dutch. The questionnaire was peer-reviewed, both by Dutch academics and law enforcement officers. The social influence construct was slightly adapted to fit the research context. We introduced two items with which a police officer's social influence on a filer's perception of a virtual experience could be explored. We reasoned that the police officers guiding filers through the reporting procedure, both the officer who meets the filer face-to-face and the officer entering into an exchange with the filer virtually, might influence the filer's perception of the experience. For instance, the officer who meets the filer face-to-face might influence the level of acceptance in either a positive or a negative way, that is, the officer may promote or sabotage the use of virtuality as part of the process, intentionally or not. Finally, the questionnaire was pre-tested on police-officers at first and eventually on citizens. Before constructing scales from the individual items, we performed a principal component factor analysis for the generalized arousal scale to explore its multi-dimensional character. From the factor analysis (KMO=0.76, Bartlett's test of sphericity: Chi^2=581, sig.=0.000, R^2=0.69), we found a two factor solution, instead of the three predicted by theory. A two factor solution seemed to fit the data best, as only two components had eigenvalues higher then 1, and after two components the Cattell's scree plot started to flatten. Additionally, we used varimax rotation to find the optimal solution.4 Both variables were entered into regression analysis along with other variables from our conceptual model. However, the new variables both caused high VIF (>5) and low tolerance values (<0.2), indicating multicollinearity problems (O'Brien, 2007). To overcome this violation, we followed Tabachnick & Fidell (2007) and combined both components in one variable. We show the reliability of this now one-dimensional arousal scale, and of other scales, in Table 3.6. All scales were found to be sufficiently reliable. The hypotheses were tested using multiple regression analysis. We report our results in the following section.

5. RESULTS

5.1 Descriptive statistics and correlation analysis

The pool of 224 respondents included 135 males and 89 females between the age of 13 and 83. Both the mean age and the median age is 40 with a standard deviation of 16. More than half of the respondents, 142 of them, had at some time previously had the experience of reporting a crime. We give the descriptive statistics for other variables and their correlations in

Table 3.6 Reliability analysis for scales

Scale/variable	Reliability (Cronbach's Alpha)	Items
Intention to use again	0.91	• I intend to report another crime in the same virtual way • I predict that I will report another crime in the same way • I plan to report another crime in the same way
Performance expectations	0.62	• I found this way of reporting a crime useful • This way of crime reporting is quick
Effort expectations	0.65	• What was said through the virtual system was clear and understandable • It was easy for me to use the virtual system • I found the virtual system easy to use • Learning to operate the virtual system was easy for me
Facilitating conditions	0.66	• The atmosphere created in the room where I reported a crime was excellent • I felt that my privacy was guaranteed as I reported a crime • The room temperature was comfortable in the room where I reported a crime
Social Influence	0.77	• In general the police officers were supportive as I filed a report • While I was reporting a crime the police officers were supportive of me
Anxiety	0.68	• I felt apprehensive about using the virtual system • I hesitated to use the virtual system for fear of making mistakes I could not correct • The idea of using a virtual system is somewhat intimidating to me
Generalized arousal	0.85	**Feelings** Looking back on the crime committed against me, I feel: • angry (ga11) • anxious (ga12) • surprised (ga13) • confused (ga14 **Concerns** • I have suffered a great injustice (ga21) • I feel victimized again (ga22) **Perceived seriousness of the crime** • I perceive the crime committed against me as being serious (ga3)
Social presence	0.83	I found the police officer taking the report through the virtual system to be: • friendly • sympathetic • warm • responsive

Table 3.7. Social presence and generalized arousal were both mean-centered (MC) to prevent potential multicollinearity problems.

Although the respondents on average reported feeling somewhat nervous (mean = 4.72), their intention to use the technology again should the need arise, our dependent variable, intention

Table 3.7 Descriptive statistics, correlation analysis (* p<0.05; ** p<0.01), collinearity diagnostics (vif; tolerance)

	Mean	Standard deviation	Intention to use again	Gender (0=male; 1=female)	Age	Previously filed a report (0=yes, 1=no)	Social influence	Performance Expectations	Effort expectations	Social presence MC	Facilitating conditions	Experience with related technology	Generalized arousal MC	Anxiety
Intention to use again	5.38	1.41	1.00	-0.05	0.09	0.08	0.42**	0.75**	0.66**	0.63**	0.59**	0.10	-0.06	-0.3**
Gender (0=male; 1=female)	-	-		1.00	0.13*	0.08	-0.01	0.05	-0.10	0.02	-0.00	-0.16	0.11	0.16*
Age	40.31	16.04			1.00	0.05	0.05	0.15	0.17*	0.19*	0.31**	-0.27	0.03	0.03
Previously filed a report (0=yes, 1=no)	-	-				1.00	-0.03	0.08	-0.01	0.02	0.06	-0.10	-0.03	-0.03
Social influence	4.86	1.56					1.00	0.34**	0.31**	0.41**	0.31**	0.11	-0.05	0.03
Performance expectations	5.42	1.16						1.00	0.69**	0.62**	0.57**	0.13	0.06	-0.22**
Effort expectations	5.53	0.96							1.00	0.64**	0.57**	0.17	-0.04	-0.29**
Social presence MC	0.00	1.22								1.00	0.63**	0.09	-0.09	-0.20**
Facilitating conditions	5.21	1.14									1.00	0.11	-0.04	-0.23**
Experience with related techn.	4.24	2.10										1.00	0.01	-0.01
Generalized arousal MC	0.00	1,00											1.00	0.14
Anxiety	2.73	1.35												1.00

to use again, was high (5.38 out of a maximum 7). The variable effort expectations had the highest average (5.53). This is not surprising in retrospect as filers did not actually have to learn to operate the system, as they do in most other studies of technology acceptance. The scores for most of the other variables, including performance expectations, social influence, facilitating conditions, and social presence were high. The only variable that had a relatively low score was anxiety, with a mean score of 2.73.

The correlations between performance expectations and effort expectations (r=0.69) and between performance expectations and intention to use (r=0.75) are high but not problematic; as both are lower than 0.85.

5.2 Regression analysis

We ran three models: (1) Model 1 includes only the control variables; (2) Model 2 adds the affective variables; (3) Model 3 adds to model 2 the cognitive variables. The results of the regression analyses are presented in Table 3.8. Regression analysis assumptions (multicollinearity, singularity homoscedacticity, linearity, independence of residuals, normality and outliers) are not violated. We conclude that multicollinearity is not a problem (Lewis-Beck, Bryman, & Liao, 2004; O'Brien, 2007).

Model 1, with only the control variables, is insignificant (F [sig] = 1.18 [0.319]) indicating that these variables exert no influence on acceptance of the technology. Models 2 and 3 are significant. Model 3 provides 15% more explanatory power and hence is the preferred model because it has the highest explanatory power, while remaining sparse and parsimonious. Four significant predictors explain 69% of the variance in intention to use: performance expectations (β=0.54), social presence (β=0.18), anxiety (β=-0.14) and social influence (β=0.11). The coefficients of the interaction between social presence and generalized arousal, and those of the following cognitive predictors, effort expectations, facilitating conditions and experience with related technology, are all statistically insignificant. The same is true for the coefficients of all the control variables, gender, age and previously filed a report.

6. CONCLUSION

What factors determine user acceptance of virtual delivery of public services? Our results show that the factors that determine acceptance of the virtual delivery of public services, as demonstrated by the intention to again use VMC, are the cognitive variable performance expectations, and the affective variables social presence, anxiety and social influence. Thus our

Table 3.8 Determinants of the intention to use virtual technology

Independent variables	Model 1: Control variables (Tolerance/VIF)	Model 2: Model 1 + affective variables (Tolerance/VIF)	Model 3: Model 2 + cognitive variables (Tolerance/VIF)
Constant	5.02	4.98	1.2545
Gender (0=male; 1=female)	-0.187 (0.957/1.044)	-0.07 (0.898/1.114)	-0.139 (0.850/1.176)
Age	0.009 (0.958/1.044)	-0.04 (0.914/1.095)	-0.006 (0.783/1.278)
Previously filed a report (0=yes, 1=no)	0.219 (0.989/1.011)	0.09 (0.976/1.024)	-0.081 (0.953/1.050)
Social presence (A)		0.61*** (0.636/1.572)	0.22** (0.385/2.600)
Anxiety (A)		-0.25** (0.841/1.190)	-0.164** (0.732/1.365)
Social influence (A)		0.23** (0.799/1.252)	-0.112* (0.736/1.359)
Social presence* Generalized arousal (A)		0.006 (0.81/1.235)	0.025 (0.806/1.240)
Performance expectations (C)			0.71*** (0.357/2.800)
Effort expectations (C)			0.023 (0.308/3.251)
Facilitating conditions (C)			0.069 (0.492/2.033)
Experience with related technology (C)			-0.011 (0.871/1.148)
N =	224	224	224
F (sig.) =	1.18 (0.319)	21.85 (0.000)	24.57 (0.000)
R square =	0.018	0.54	0.69
F change (sig.) =	0.487 (0.692)	33.81 (0.000)	16.21 (0.000)

* p<0.1 ; ** p<0.05; *** p<0.01; A=affective; C=cognitive.

hypothesis that social presence has a positive effect on intention to use is confirmed, while our hypothesis that this relationship is moderated by perceived arousal, with regard to the crime being filed, is not confirmed.

Our results show a statistically insignificant impact of effort expectations, unlike in most empirical UTAUT studies where it is a strong predictor. This may be because the respondents in our study were not asked to learn the technology, but simply sat down and "used" the system in the way they would had the officer taking the report been using a pen and paper to record the information they were giving.

Perceived experience with related technology showed considerable variation between respondents (standard deviation 2.04), but it did not prove to be a predictor for intention to use. This is probably due to the fact that, similar to effort expectations, no related experience was needed to use the technology. Females and persons who are older often are assumed to be generally less technology literate. However, these effects are not found in this study

probably due to the ease with which untrained users can use the system. Our explanation for this counter intuitive finding regarding technology acceptance by older persons, is that they felt that they were in control of this specific technology. Older people often feel deficient or a bit clumsy when confronted with new technology. In this case the technology was considered to be easy to use, indeed is used passively, and this facilitates acceptance. Finally, facilitating conditions were probably an insignificant predictor because there was so little variation in the responses, a large majority of respondents finding the conditions to be simply good. This may be because that facilitating conditions were not seen as a barrier to using the virtual system.

The moderating effect of general arousal could not be confirmed empirically. Although victims of crime may be very nervous, this does not seem to influence the strength or direction of the relationship between social presence and intention to use. This finding is contrary to our expectations. One explanation may be that although persons filing reports were on average moderately aroused, the medium itself seems to fulfill a certain minimum "social presence". Persons who wanted to report a crime in which violence was a factor, such as rape, may have had much stronger emotions to report. Though including such cases in our sample may have led to different results, we were for ethical reasons not comfortable including persons who wanted to report certain kinds of crime, as stated in our third endnote. Moreover, the police authorities have concluded that using VMC technology in some cases is not desirable. Virtually taking reports of burglary, robbery or pickpocketing, or of bicycle, motorcycle or automobile theft is, on the other hand, an appropriate way to reduce costs, including labor costs, in delivering public services.

7. DISCUSSION

Our goal in conducting this study was to test the relative importance of affective predictors in acceptance by the public of public services delivered using virtual technologies. We used and extended with a social presence construct the Unified Theory for the Acceptance and Use of Technology (UTAUT). Both the original UTAUT model and our extended version have significant predictive power. We found empirical support for our premise that, in the case of the virtual delivery of public services, affective variables are relatively more significant predictors of acceptance than cognitive variables as one would expect from UTAUT's central predictors and other conventional technology acceptance models.

According to the literature on the acceptance of technology, and specifically the UTAUT, cognitive variables such as effort expectation, facilitating conditions, experience with the technology, and the control variables of age and gender, play an important role in predicting

the conative intention to again use the technology. In the eight conventional acceptance models reviewed in this study, only a minority of predictors (five out of thirty) can be characterized as affective. In this empirical study we found that three of the four statistically significant predictors, i.e. social presence, anxiety and social influence, are affective variables. This finding leads to the conclusion that acceptance of virtual technologies in the delivery of public services depends on affective predictors. Extending the UTAUT model by including social presence proved beneficial in predicting acceptance of the virtual technology considered in this study. Our results show social presence to be the second strongest predictor of acceptance of technology, thus there is reason to believe that social presence is of pivotal importance in explaining the acceptance of virtual technologies in the delivery of public services. We believe that replication of this study in different contexts would prove very interesting (Ajzen, 1985, 2005; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975).

Future research could replicate this study with other types of public services or other types of technologies used for virtual delivery of public services. Some exemplar studies have tested the UTAUT model in e-commerce, e-government, and telemedicine (Cyr et al., 2007; Schrijver, 2008). Another interesting avenue for research would be to test if users who are free to decide whether or not to use virtual technology are willing to do so. We were unable to test the effect of this variable, which is generally used in testing technology acceptance, as our users were not given the option to file a report in another way. Also the role ethnicity might have on acceptance of virtual technologies is an interesting direction for future research. Some research suggests that there are small, but noticeable effects (Dupagne & Salwen, 2005; Kim, Jung, & Ball-Rokeach, 2007). Longitudinal studies of the acceptance of virtual technologies is another promising area for future research (Venkatesh et al., 2003). Such an approach was not possible in our context since too few persons return to report another crime. Other service contexts, the delivery of routine municipal services and health care for instance, would be better suited. Finally, in this study the service provided was not delivered in a completely virtual way. Filers would see one or more officers face-to-face on arrival at the station, and they were guided by a police officer to the room in which reports were taken. This contact and guidance increased the level of social presence, and since social presence has a positive effect on intention to use, it would be interesting to investigate whether our model can also explain acceptance of a totally virtual delivery of public services. Another limitation of our study is that the technology requires no "use" in the sense of manipulation of any kind. The set-up of the system and its hands-on use is not done by the filer but by the police. It would be interesting to test reactions of persons who have to take a more active role, for instance if the information were to be provided on line by someone who would like it to be entered into a police report.

For practitioners we have a number of recommendations. First, considering the broad range of crimes reported using VMC, we think it is reasonable to suggest that VMC could successfully be used in delivering many other kinds of public services, as one reviewer of a previous version has suggested, VMC might be used by motorists disputing a parking ticket. Second, investing in a virtual technology for the provision of a public service, is a strategic decision between what Treacy and Wiersema (1995) call 'customer intimacy', that is excelling in customer service, and operational efficiency. The use of VMC in crime reporting is exceptional in that it provides both a high level of customer intimacy, through the high social presence of the medium, while at the same time also increasing operational efficiency by pooling all of the resources needed to take crime reports in one shared service center (Strikwerda, 2010). While the Dutch police authority is adopting the reporting of crime virtually, and some Dutch municipalities and health care providers are experimenting with other ways to deliver services virtually, the application of VMC in other contexts might not have the same kinds of outcomes. Our suggestion to organizations considering service delivery virtually is to first determine the extent to which customer intimacy and operational efficiency are required, and to carefully consider ease of use and affective criteria, especially social presence. In this study we found that the quality with which the technology mediates the communication process between actors during the process of delivering a public service is important. This study shows that affective predictors explain to a considerable extent acceptance and use of virtual technologies by persons receiving a public service. Hence, the technology itself has direct and substantial impact on the communication process between members of the public and the service provider, and so on the acceptance of a virtually delivered service. Second, the technology should be very easy to use. In this study the technology was so easy to use that experience with related technology, which is a common predictor in conventional technology acceptance models, lost its predictive value entirely.

ENDNOTES

1 Teleweide (http://www.teleweide.nl) and Welzijn Aa & Hunze (http://www.welzijnaaenhunze.nl/marktwerk/virtuele-loketten.html) are two other empirical examples of a municipal and healthcare project in the Netherlands in which virtual technology is used. In both examples citizens living in rural areas are connected to municipal/health services through video-mediation.

2 For a comprehensive discussion on presence and social presence see Biocca et al. (2003), Lee (2004) and Lee et al. (1995).

3 UTAUT is extensively used and highly cited. According to Google Scholar (http://www.googlescholar.com), as of April 2011, the UTAUT citation count was 3374.

4 Using Varimax rotation, we found that (factor loadings): GA22 (0.90), (0.76), GA3 (0.83), GA11 (0.72) formed one component and GA12 (0.84), GA13 (0.49), GA14 (0.91) formed the other. See Table 3.6 for an explanation of the abbreviations for the items used here.

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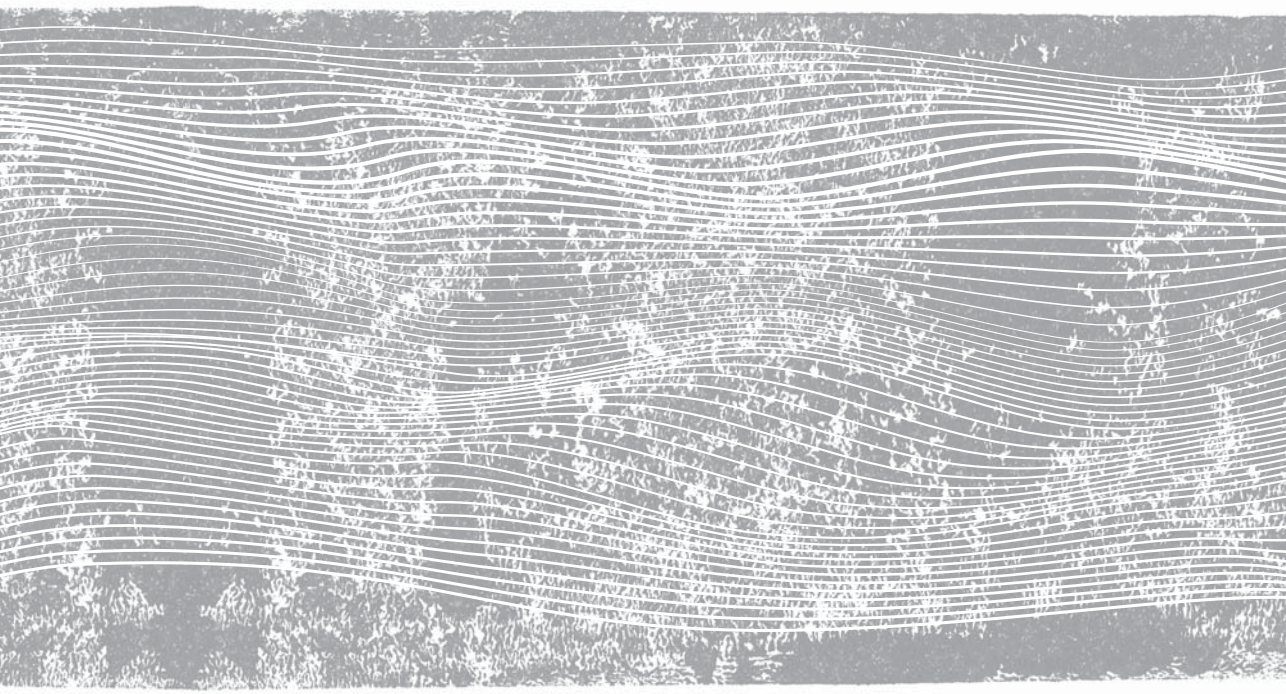
Chapter 4

Enhancing ICT decision-making using first-hand input from ICT end-users: a mixed methods approach[1]



[1] A modified version of this chapter is submitted for publication in Organisation Studies by Hoefnagel, Oerlemans, Goedee, van Exel.

ABSTRACT

In this study we explore the value of eliciting input from ICT end-users to improve ICT decision-making. We use Q-methodology in combination with an Appreciative Inquiry approach which recognizes that organizational members are more forthcoming when they believe that their opinions will be valued, and decision makers more receptive when feedback is constructive. We interviewed 163 police officers of the Dutch Police Force, and subsequently conducted a by-person factor analysis of each set of responses. This allowed us to distinguish four generative viewpoints about Dutch policing's ICT's. We present each of those points of view, and reflect upon what impact they might have on ICT development and practice.

1. INTRODUCTION

In this study we present four distinct generative viewpoints on the use of ICT on the job, which are representative of what was expressed in interviews with 163 police officers. We captured the essence of what was related in those interviews using a novel combination of Appreciative Inquiry (AI) and Q-methodology (QM) (Cooperrider & Srivastva, 1987; Watts & Stenner, 2012). Later we provide detailed narratives in which interviewees express what they *appreciate most* about the ICT at their disposal at work and what they *would like to see more of*. Before we do that we will explain why we think generative viewpoints are helpful, for consultants, decision makers and researchers. First, we describe our research context.

Until recently, a small number of strategic managers made all of the Dutch Police Force ICT development and practice decisions. The 65,000 police officers using ICT on the job had no voice in what software and hardware would be adopted or implemented. In 2011 the Netherlands Court of Audit, an independent authority analogous to the Government Accounting Office in the US, called for improvement in the *ease of use* and the *usefulness* of the police force systems (Stuiveling & Schoten van, 2011). Years of strictly top-down ICT decision-making meant that there was no first-hand knowledge that might be used to accomplish that. On the contrary, because they had never been consulted about it, many police officers had a negative view of the ICT at their disposal. The Chief Information Officer (CIO) of the Dutch Police Force was aware of these stumbling blocks, and was willing to open-up the ICT decision-making process to remedy them. A study was commissioned to help make that possible.

A primary goal of the project was to enhance ICT decision making by tapping into a neglected store of end-user first-hand knowledge. We enthusiastically agreed to carry out an explorative study that, it was hoped, would be helpful in lessening the first-hand ICT knowledge deficit. We

were about to take on the challenge of getting police officers, who had reason to be skeptical, to share their insights, views and opinions, in short, to become engaged in the force's ICT decision making process. We wanted to collect relevant first-hand knowledge; to overcome any negativism or reticence to participate in ICT development in the future that might stem from the way it was handled in the past; and to involve a large number of police officers in order to have multiple viewpoints. Finally, we wanted concrete results, that is, we wanted our findings to have clear implications for changes in policy.

What methodology would allow us to do all these things? Cooperrider and Whitney (2000: 3) have defined appreciative Inquiry (AI) as "[a] search for the best in people, their organizations, and the relevant world around them". AI especially appealed to us in meeting the first three of the aims we list above (Cooperrider & Srivastva, 1987). First, it is rooted in social constructionism, and has been successfully used to gather first-hand knowledge from representative groups within organizations. Second, it is a positive approach that can be used where there might be conflict and negativity (McNamee, 2003; Schultze & Avital, 2011). Third, there is evidence that AI can be applied effectively to large groups (Barros & Cooperrider, 2000; Powley et al., 2002). We also determined that the analytical capabilities of AI could be strengthened when combined with a methodology known to yield concrete results (Dick, 2004; Van der Haar & Hosking, 2004; Grant & Humphries, 2006). We decided to combine AI and QM. QM can handle inter-subjectivity inquiry. Moreover, it provides a strong set of analytical techniques that we believe can strengthen AI, and yet not undermine its methodological and metaphysical integrity. We will discuss and demonstrate this later (Watts & Stenner, 2012). To our knowledge, combining AI and QM in a single research design is genuinely a novel generative genre, i.e. an innovative approach to scholarship and practice (Avital et al., 2013). We are convinced that the AI-QM combination is ideally suited to large-scale participatory research undertaken to yield concrete results, while using the two in tandem will not come at the cost of scholarship (Fineman, 2006; Roberts, 2006).

This article is structured as follows. In the next section, we describe in more detail AI and QM and discuss how the two complement each other in one generative genre. We then outline our methodology, a combination of AI and QM, for the purpose of uncovering appreciative viewpoints about police officer's ICT support in a large N design. We then report our results using generative viewpoints, noting as we do some of what the study participants have in common as well as what makes them different from one another. We follow with conclusions, reflecting on what we have uncovered, and outlining the implications of the study for the Dutch Police Force. We end with implications for practitioners on a broader level and researchers in general.

2. APPRECIATIVE INQUIRY AND Q-METHODOLOGY

Appreciative Inquiry

AI has often been defined by contrasting it to other problem-solving models (Cooperrider & Srivastva, 1987; Grant & Humphries, 2006). Generally, in problem-solving models solutions are sought through analysis of what causes given problems to exist. Consequently, such models can easily overemphasize organizational weaknesses (Ludema et al., 1997; Cooperrider & Whitney, 2006), and thereby create a negative culture of blame that causes individuals to be on the defensive (Finegold et al., 2002). This can in turn lead to a degenerative spiral (Cooperrider & Whitney, 2006). In contrast to this, AI does not treat organizational issues as problems to be solved, but rather as mysteries to be embraced. At the methodological core of AI lies an affirmative way of asking questions that recognizes the positive potential inherent in all human systems. Cooperrider and Whitney (2001) underline this in their description of AI as a collective search for the "best in people". AI can lead to the discovery of what gives life to organizations, as living systems, and what they are capable of in economic, ecological and human terms. There are five principles central to AI: the constructionist principle, the principle of simultaneity, the poetic principle, the anticipatory principle, and the positive principle. We summarize them below (Cooperrider & Whitney, 2001):

- *The constructionist principle* does not see the individual, but rather the relationship between individuals, as the locus of knowledge, and as such holds that concepts such as reality and truth are social constructions. Organizations are living, human constructions. Human knowledge and the fate of the organization are inextricably interwoven and inevitably the way we know is faithful (Gergen, 1978).

- *The principle of simultaneity* holds that reality is an evolving social construction and hence it is influenced through inquiry. In essence, to inquire is to intervene. Intervention is initiated with the very first question asked, therefore inquiry and any change it might bring about must be seen as happening simultaneously (Cooperrider & Whitney, 2001:15).

- *The poetic principle* recognizes that every member of an organization contributes to its story. The Internet is a prime example: no one can claim exclusive authorship, and it will continue to evolve in unpredictable ways through the efforts of many. Cooperrider and Whitney (2001:15) refer metaphorically to organizations as open books and sum up the poetic principle in writing that organizational histories can be compared to "the endless interpretive possibilities in a good piece of poetry or a biblical text".

- *The anticipatory principle* is based on the notion that we continuously project into the future. How we see the future influences our behavior today, much like a movie projector is projecting its image on a screen. With our projections we bring our (expected) future in the present as mobilizing agents, with which we anticipate our futures. As we have the ability to imagine how things can be, perhaps one of AI's most beneficial aspects is that it can channel that ability in a positive way (Cooperrider & Whitney, 2001).
- *The positive principle* holds that in conducting an inquiry, the more unconditionally positive the first question asked, the more successful and long-lasting the change sought will be. The questioner must be positive, or as Cooperrider and Whitney (2001:17) describe it, "[be] able to learn, to admire, to be surprised, to be inspired…"

Appreciating Appreciative Inquiry

Since its emergence in the 1980s, AI has been applied in a wide variety of disciplines including organizational development (Mantel & Ludema, 2000), change management (Ryan et al., 1999), and information systems (Avital & Cooperrider, 2004; Asif & Klein, 2009; Avital et al., 2009; Schultze & Avital, 2011). Its positive attributes have been extensively discussed since its inception. More recently, AI has been the subject of several meta-case analyses (Bushe & Kassam, 2005; Yaeger et al., 2005; Bushe, 2011). Bushe and Kassam (2005:162) examined 20 cases in which AI was applied seeking evidence of its *transformational capacity*, which they define as "changes in the identity of the system and qualitative changes in the state of being of that system". They concluded that seven of the cases showed transformational outcomes, either of new knowledge, models, and/or theories, or of a new action-stimulating metaphor. Another meta study carried out by Yaeger et al. (2005) assessed 50 empirical AI studies concerning organizational development and change published between 1986 and 2002. While they found that most of the research in those disciplines continues to be based on anecdotal evidence, the experimental studies testing AI's effectiveness are highly supportive, and in general AI is superior to other methods. Finally, in the most recent review of the literature, Bushe (2011) found several "levers for change", that can build upon existing strengths, engage many stakeholders in a common effort, and strengthen core attributes. Other scholars also show how AI can help reformulate perceived weaknesses and address challenges in a constructive way (McNamee, 2003). Despite this, AI's approach has been criticized, as we discuss next.

AI has been seen by some as an action research approach with little self-reflection or self-critique. (Yaeger et al., 2005; Grant & Humphries, 2006) Scholars critical of AI have seen its intense positivism as a blinding perspective and warned against uncritical use (Dick, 2004; Van der Haar & Hosking, 2004; Fineman, 2006; Grant & Humphries, 2006). Others have equated AI

to "warm, fuzzy, group hugs" (Fitzgerald et al., 2001:17), or said that it leads to a false sense of euphoria (Fineman, 2006) while "ignoring the shadow" (Reason, 2000:10), and even that it could potentially lead to an avoidance of dealing with dangerous problems (Roberts, 2006). Still others find that AI scholarship lacks analysis (Golembiewski, 2000) and concrete results, which undermines meaningful and lasting change (Yaeger et al., 2005; Fineman, 2006; Grant & Humphries, 2006; Dematteo & Reeves, 2011). On the other hand, some scholars have suggested avenues for AI improvement, such as exploring the requirements needed to guide it (Bushe, 2011), thereby enhancing researcher's reflexivity (Van der Haar & Hosking, 2004). It has also been suggested that by integrating AI with critical theory a new critical appreciation process might emerge (Grant & Humphries, 2006). Finally, there have been calls for longitudinal case studies of AI successes and failures in order to identify its potential moderators and contingencies (Head, 2005; Bushe, 2011).

Q-methodology

QM has not been applied extensively in the field of information systems research. Watts and Stenner (2012) provide a comprehensive introduction to QM. QM allows for a systematic discovery of subjectivities on a given topic by having respondents rank items according to their opinions, beliefs, and attitudes (Brown, 1993). The result of a QM study can be used to "describe a population of viewpoints instead of a population of people in traditional statistics" (Risdon et al., 2003). The analytical core of QM is a by-person factor analysis. While conventional factor analysis involves finding correlations between items, and so aids in reducing many items to a number of factors by variable, Q-factor analysis involves finding correlations between subjects across a sample of items or tests, thus correlating persons instead of items (Stephenson, 1935). Thus, Q-factor analysis can reduce many individual points of view to a few factors, resulting in a limited number of shared points of view on a given subject. Recently, QM has been used in a number of interesting contexts, for instance, higher education (Vincent & Focht, 2009; Bradley & Miller, 2010), health care management (Jedeloo et al., 2010) chronic pain management (McParland et al., 2011), tourism (Stergiou & Airey, 2011), and narrative therapy (Wallis et al., 2011). We discuss below some of the central characteristics of QM.

- *Definition of the concourse and Q-set design* The first step in conducting any Q-study is to define the concourse, what Brown (1993) has called "the flow of communicability surrounding any topic," or in other words, the variety of things people say about a topic. The next step consists in abstracting a Q-set from that concourse, and as that limited set of statements is the actual research instrument, it should be representative of the full concourse. Each statement is recorded on a card then given to participants.

- *Selection of participants* The third step is the selection of participants. Given that the objective of a Q-study is to explore different views on a topic, participants are sampled for diversity. From a mere theoretical and methodological point of view, Brown (1980) argues that it is not necessary to have many respondents identify a point of view to enable the emergence of factors, which can be contrasted and compared. The people represented by those factors ensure that the major ones will be manifested with sufficient breath.
- *Q-sorting procedure* Step four is Q-sorting. This is done by the participants as only they can give full expression to their subjective views (Stephenson, 1953), i.e. they speak for themselves (Brown, 1996). Interviews are the preferred way to carry out Q-sorting, although it can be done by means of online questionnaires (Watts & Stenner, 2012). However it is done, participants are given a sample of items, called the Q-deck, which they are asked to rank according to a given procedure. We provide an example of a completed Q-sort in Figure 4.2. After the Q-sort, participants might be asked to elaborate on their rankings in an effort to obtain still richer data.
- *Analysing and Interpretation* Finally, interpretations of the data are made. This is mostly done by referring back to what participants have related in the Q-sorting interviews, and with the help of a factor-array, which summarizes individual factors by calculating the weighted means of each to obtain an average Q-sort by factor.

Appreciating Q-methodology

QM's qualities have been both lauded as strengths and criticized as weaknesses. We believe that two central ones can be regarded as strengths and weaknesses at the same time. First, Q-factor analysis, which allows for the sorting and ranking of the qualitative data that makes up the analytical core of QM, can provide rich, meaningful, and measurable results in large N settings (Brown, 1993). However, its unconventional application of factor analysis, i.e. correlating persons rather than tests, has led to a conceptual critique by proponents of r-factor analysis (Watts & Stenner, 2012). Second, the same technique that has been praised for bridging qualitative and quantitative research traditions (Brown, 1980; McKeown & Thomas, 1988; Brown, 1996), quantitative researchers have found fault with it for being too subjective, and qualitative researchers for it being too statistical, thereby risking be caught in the middle (Watts & Stenner, 2012). For a recent discussion of the pros and cons of QM see Brown et al. (2014).

AI and QM: a good match

What is it about the combination of AI and QM that makes us believe that using the two together will benefit this research? First, QM factor analysis increases the analytical grip needed

to interpret large amounts of generative AI data in both a meaningful and statistically sound way. Furthermore, it makes the identification of distinct appreciative viewpoints possible. Second, in using QM the nature of the results can be addressed early in the inquiry process, that is, with the development of the Q-deck, which as we say above, is the first step in the process. This means that the nature of the results does not come as a complete surprise at the very end of the inquiry process. In addition, deploying a Q-deck in a Q-sort, and using the prescribed statistical techniques will lead to a better analytical grip on the data, enhancing analysis, and yielding concrete results. Third, using QM Q-sort along with AI makes it possible to conceptualize appreciation along a continuum, not just high or low, one end or the other. The central premise of AI is constructionism (Cooperrider & Srivastva, 1987; Dick, 2004). Constructionism can be fully supported by QM as it can be adapted to fit theoretical requirements (Watts & Stenner, 2012). Not surprisingly then, constructionism is the most often used and sustained theoretical basis for QM applications (Watts & Stenner, 2012). See Watts (2008) for a review of the meta-theoretical links between social constructionism and QM.

3. METHODOLOGY

In this section we lay out how we combine AI and QM (see Figure 4.1). Earlier we discussed the five principles that inform AI research: the constructionist principle, the principle of simultaneity, the poetic principle, the anticipatory principle, and the positive principle (Cooperrider & Whitney, 2001). As we describe our methodology, we indicate in brackets the principle, or principles, on which we draw.

Q-set design

Our intention in carrying out this study was to capture first-hand knowledge from end users of the ICT systems of the Dutch Police Force. Arriving at a Q-set required a joint effort between possible participants, in this case police officers, and researchers, ourselves, as the very lack of knowledge that prompted the study meant that the participants would need to define meaningful topics, and in a language relevant to them {constructionist, poetic and positive principles}. A conference organized around AI principles was planned. The aim was to capture the ways police officers expressed themselves {poetic principle} when talking about ICT used in performing work tasks. This would form an initial set of items that could be used in Q-sort interviews. The conference was attended by 57 police officers, and resulted in 26 initial items, which were later subjected to validation.[2]

2 A comprehensive report is available from the authors.

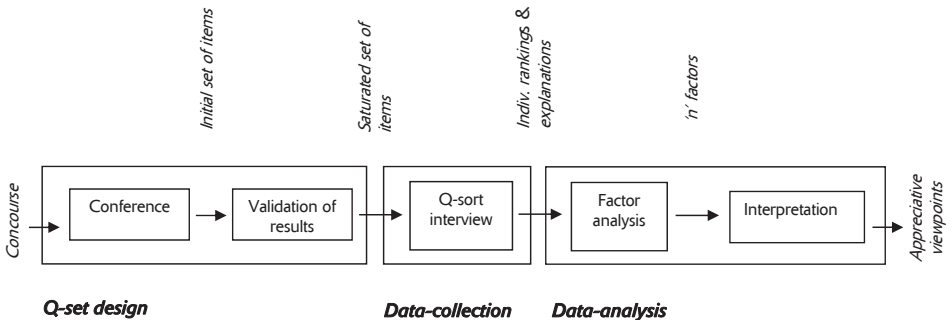


Figure 4.1 Graphical representation of this study's research process, its inputs and outputs.

Following the conference we needed to determine if indeed a sufficiently comprehensive variety of topics had been captured and also whether the language in which those topics would later be conveyed would be recognizable to police officers not present at the conference. We did this by interviewing four officers, each individually, and by forming two focus groups of six police officers each. Validation was done by carrying out test Q-set interviews. The questions asked would be used again later during the data-collection phase. After completing a test set of questions, respondents were asked three final questions: (a) Could they fully express their views given the items in front of them? (b) Were there items missing? and (c) Were there items that needed to be modified? What we learned from the first focus group allowed us to add two new items, and to make some minor modifications in the wording of two others. After that nothing was added to the Q-set, meaning that the Q-set was saturated after 28 items.

Data collection

Three groups of in total 37 police trainees were instructed in how to perform a Q-sort interview. The trainees also helped in selecting participants for the Q-sort interviews.

Selection of participants for Q-sort interviews

The trainees received on-the-job instruction and were later assisted by mentors. The couple of student police officer and their mentors selected participants for the interviews; they were given two guidelines for selection of participants. Each of them carried out five interviews: three with police officers engaged in either neighbourhood policing or surveillance, one with a detective, and one with an intake service officer. The participants were from 26 precincts, some urban and some rural, across the Netherlands. We chose this combination at it was

representative of the numbers of police officers in such roles across the Dutch Police Force. Within those populations, subjects were chosen at random. We structured the selection process in this way to provide the widest possible breadth, and thereby to insure that the major ICT support issues would be manifest (Brown, 1980). Moreover it meant that a large variety of (co-) constructions of past, present, and future Dutch Police Force ICT development would be covered {poetic principle}.

Appreciative Q-sorting interviews

Our Q-sorting was done by means of appreciative interviews as this allowed for the kind of natural speech called for by both AI and QM (McKeown & Thomas, 1988; Preskill & Coghlan, 2003), and because a proper sorting instruction could be given. The interview protocol was designed as follows. First, participants were told what the goals of the study were and given an idea of what to expect during the interview. They were told about the Q-deck, and given the 28 cards that made it up, one item per card. They were asked to consider the items noted on the cards, then to sort them into three piles according to whether they saw the topic in a positive, negative or neutral way. When this had been done, they were asked to rank the items: positive associations on the left hand-side of a Q-sorting grid, negative associations on the right hand-side, and those about which they were neutral around the middle. They were free to redistribute the items at will during this process. We were able to maximize self-referentially (Watts & Stenner, 2012). The Q-sorting grid comprised a 7-point Likert scale with appreciation conceptualized as a continuum ranging between: appreciate most (+3) and appreciate least (-3) (see Figure 4.2).

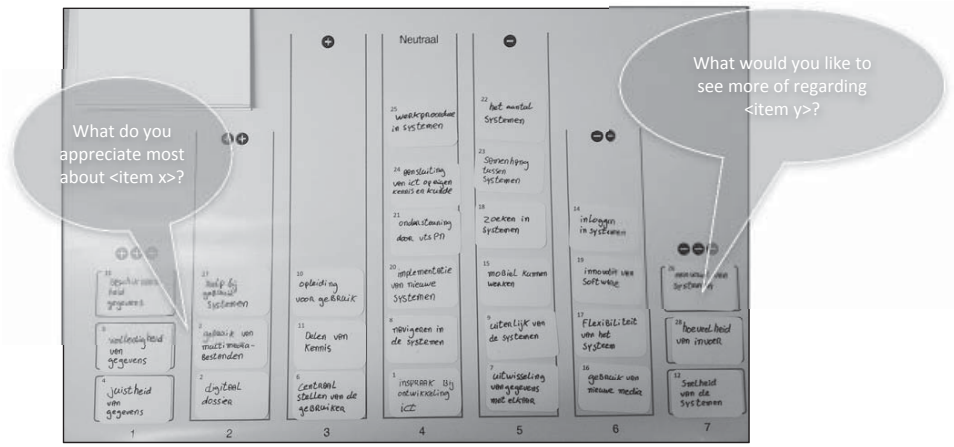


Figure 4.2 Q-sort and appreciative questions.

After the sorting was done to the satisfaction of the participant, an in depth interview commenced in which the methodological core of AI, the unconditional positive question, was brought to the fore. In each case the interviewer focussed on the items that the participant had ranked as most meaningful, beginning always with "the best" {positive principle}. The participants were asked *what they appreciated most* about a certain item {positive principle}, by way of contrast with what they appreciated least, and then, what they *would like to see more of*. Our intention in asking this question was to steer thinking towards solutions and away from thinking in terms of problems. In this way we hoped that the participants would begin to consider alternative possibilities, perhaps to a future that would not have been imagined before {poetic and anticipatory principles}.

Data analysis and interpretation

We organized the data we collected along the lines of three sequential transitions: (1) from individual Q-sorts to factors, (2) from factors to factor arrays, and (3) from factor arrays to factor interpretations, the outcome of which it was hoped would be a catalyst for change (Cooperrider & Whitney, 2001). As we have said, the change we wanted to bring about was better ICT decision-making based on the first-hand knowledge of police officers who use ICT in their daily work.

We subjected 163 Q-sorts to inter-correlation and by-person factor analysis using PQ-Method software (Schmolck, 2013). We were able to extract four distinctly different factors, which are summarizations of perspectives held in common by a number of individuals {constructionist principle}. We gave each factor a name, choosing ones popular in the Netherlands: Paul, Judith, Rose and Harry (see Table 4.1). Giving names to what are *fictive representations* of groups of police officers heightens the communicability of our findings and increase the persuasiveness of our conclusions {principle of simultaneity}. Paul, Judith, Rose and Harry explain 41% of the total variance across all police officers Q-sorts (see Table 4.2), which is an adequate amount (Kline, 1994). The data support a maximum of six factors. We selected a 4-factor solution

Table 4.1 Correlations between factors

Factor	Paul	Judith	Rose	Harry
Paul	1	.318	.529	.274
Judith	.318	1	.354	.039
Rose	.529	.354	1	.358
Harry	.274	.039	.358	1

Table 4.2 Eigenvalues, defining Q-sorts, and percentage of variance explained

		Defining Q-sorts (#)		Variance explained (%)	
Factor	Eigen values	Factor	Cumulative	Factor	Cumulative
Paul	39.240	51	51	15	15
Judith	12.579	18	69	8	23
Rose	11.618	33	102	12	35
Harry	10.831	10	112	6	41

because we found it was most sensitive and responsive to the appreciative viewpoints of the participants and their interrelationship {constructionist principle}, and because we believed that it would make sense to the participants and to the CIO and others to whom we would present our findings and make recommendations {anticipatory principle}. Moreover, the analysis provided us with additional cues that a 4-factor solution is viable (see Tables 4.1 and 4.2), as we explain next.

First, each factor had a reasonably high number of defining Q-sorts, meaning that the individual Q-sorts share a similar sorting pattern, which allowed us to assume that, for example, the 51 defining Q-sorts of factor 1 share a distinct viewpoint {constructionist principle}. Taken together the four factors encompass 112 defining Q-sorts. Second, the amount of variance explained for the individual factors, as well as the eigenvalues, are reasonably high (>1.0), which is normally seen as supportive (Brown, 1980; Watts & Stenner, 2012).[3]

For the second step, we moved from factor to factor array so as to arrive at shared appreciative viewpoints {constructionist and, poetic principles}. We computed the factor array by weighted averaging the Q-sorts of the exemplars for that factor, with their factor loadings as weights. This means that higher exemplars were given more weight as they better characterize the factor (Stenner et al., 2003). Because a factor array is a weighted average Q-sort, it can also be presented as a Q-sort itself (as shown in Figure 4.2). The factor arrays of the four factors are presented in the results section.

The final step took us from factor arrays to factor interpretation which "takes the form of careful and holistic inspection of the patterning of items in the factor array" (Stenner et al.,

3 Conventional r-factor analysis decision heuristics such as Kattell's scree-plot, Humpry's rule, parallel analysis and the Kaiser-Guttman criterion were not helpful in this decision making process, which indeed is not unusual in QM studies. Instead, meaningful and statistically relevant criteria, i.e. the amount of variance explained, the number of defining variables per factor and Eigenvalues, are often used as criteria in the decision making process.

2003:2165). We took the factor arrays as the points of departure for factor interpretation. For individual factors we proceeded as follows. We first described the demographics for each factor. Next, we identified the distinguishing statements of each, which are the statements with a factor score that differed statistically significantly from its score on all other factors at a $p<.01$ level. Finally, to further clarify interpretation, we used participant appreciations taken from the interviews. In order to guarantee faithful interpretations we used only the words of the factor exemplars. The resultant interpretations follow (direct quotations, given in italics, are translated from the original Dutch into English).

4. EMPIRICAL FINDINGS: THE WAY WE SEE IT

In this section we, 163 police officers given voice through Paul, Judith, Rose and Harry, "tell it like it is" about the ICT we use on the job, 24 hours a day, 365 days a year. We reflect on the opinions about ICT we hold in common and the ones where we differ. We start with what we regard as the positive core of Dutch-policing ICT. There is a summary of average Q-sorting provided in Table 4.3, and differences and similarities in our perspectives are laid out in Table 4.4. Descriptive statistics are given in Appendix 4.1. The distribution of the sample resembles the relative numbers of police officers in the four organisational roles present in the Dutch Police Force.

Most of us regard highly our colleagues delivering **ICT support service** (X=.77) (see Table 4.3). "*They are just fantastic, quick to respond, patient and friendly.*" "*These people are just great, and every request for help is taken very seriously.*" At the same time, ICT support is the topic on which we differ the most, as is clear from what Peter and Harry have to say (see Table 4.4). We appreciate more than anything else the **accuracy of data** (X=.72). "*The information is, in general, correct.*" "*You can rely on correctness. This is in part because typographical errors are not accepted by the system.*" We also give high marks to the **completeness of data** (X=.48). "*There are many ways to enter data into the systems, which enables complete administration of a case in terms of persons, objects, locations and their relationships.*"

The same eight topics on which there is the greatest consensus, are the ones, relatively speaking, that we see in a less positive light (see Table 4.4). This means that we seem to agree most on what we would like to see done differently. First, and foremost we would like to see more **system flexibility** (X=-1.64) "*[Improving means] making the system adaptable to different roles, that is, to surveillance, intake and service, and criminal investigation.*" We think that **focusing on the user** (-1.17) could help improve system flexibility. "*Now the focus of the system is ICT development instead of the user.*" Inevitably, **participation in ICT development** (X=-1.20) is needed. "*The people from the front line were never asked to take part in ICT development, while we are the*

ones who have the kind of information needed to develop." Furthermore, **innovation of new systems** (X=-.24) should be faster. "*[Now] it takes a lot of time to implement change.*" If we can improve on this, we can also improve on another related topic, **software innovation** (-1.04). "*We really want to work with ICT that is also used in today's society, just to keep up with society.*" Take for example **use of multimedia files** (X=-1.23). We would like to see a solution that allows for a number of things not possible now. "*[We want] uploading, storing, enhancing and sharing media files embedded in the systems we use, features available nowadays.*"

Table 4.3 Average appreciation, ranked from most appreciated to least (n=163)

Item	Appreciation (X)
ICT support service (1)	.77
Accuracy of data (2)	.72
Completeness of data (3)	.48
Assistance with use of systems (4)	.37
Training for system use (5)	.28
Availability of data (6)	.23
Systems' appearance (7)	.13
Consistency with own knowledge & skills (8)	.06
Sharing knowledge with colleagues (9)	-.01
Digital filing (10)	-.24
Implementation of new systems (11)	-.24
Search systems (12)	-.44
Sharing data with colleagues (13)	-.55
System sign on (14)	-.56
Mobile working (15)	-.66
Coherence between systems (16)	-.80
Working procedure in system (17)	-.85
Ability to use new media (18)	-.85
Number of systems (19)	-.87
Navigating the system (20)	-1.01
Software innovation (21)	-1.04
Amount of data-entry (22)	-1.10
Focusing on the user (23)	-1.17
Participation in ICT development (24)	-1.20
Speed of systems (25)	-1.21
Use of multimedia files (26)	-1.23
Simplicity of systems (27)	-1.29
System flexibility (28)	-1.64

We (Paul, Judith, Rose and Harry) do see some things differently from one another. Looking again at Table 4.4 we find an answer in the items distinguishing (item z-scores which are statistically significant at $p<0.01$ level) us from one another. On these items our rank scores are often much higher or lower than the others' rank scores for a given item, as we show below. Secondary analysis revealed that the 4 generative viewpoints we represent are not related to our organization

Table 4.4 Paul, Judith, Rose and Paul: four factor-arrays. Items sorted by the degree of consensus and disagreement [or lack of it] (variance across factor z-scores)

	Item Ranked from highest to lowest degree of consensus appreciation [1..28]	Factor array (array score/ z-score sign. at p<.01)			
		Paul	Judith	Rose	Harry
Consensus ->	Focusing on the user (23)	-1	-1	-2 / -1.13*	-1
	Amount of data-entry (22)	-1	-1	-1	-2
	Software innovation (21)	0	-1	-1	0
	Implementation of new systems (11)	1	0	0	0
	Participation in ICT development (24)	-2	0	0	-2
	System flexibility (28)	-3	-3	-3	-1
	Use of multimedia files (26)	-2	-2	0	0
	Availability of data (18)	2	1	1	3
	Systems' appearance (7)	1	0	2	1
	Completeness of data (3)	2	1	3	2
	Consistency with own knowledge & skills (8)	1	0	1	0
	Ability to use new media (18)	-1	-2 /-.95*	0	0
	Speed of systems (25)	-2	-2	0	-3
	Simplicity of systems (27)	-1	-3	-3	0
	Working procedure in system (17)	0	2	-1	1
	Digital filing (10)	0	2	-1	1
	Training for system use (5)	2	0	2	2
	Accuracy of data (2)	3	1	3	3
	Assistance with use of systems (4)	3 / 2.03*	0	1	-1
	Sharing knowledge with colleagues (9)	1	2	-1	2
	Navigating the system (20)	-1	-1	-3 / -1.18*	1
	Coherence between systems (16)	0	1	-1	-3 /-1.52*
	Mobile working (15)	0	-3 / -1.63*	1	1
	Sharing data with colleagues (13)	1	3 / 1.39*	-2	-2
	Number of systems (19)	-3 / -1.53*	3/ 1.39*	0	-1
	Search systems (12)	0	3 / 2.26*	-2 / -1.09*	3 / 1.44*
	System sign on (14)	-3 / -1.62*	2	3 / 1.85*	1
Disagreement <-	ICT support service (1)	3 / 1.52 *	1	2	-3 /-1.83*

background (type of police officers and regional unit), except for Harry: he typically represents a general criminal investigator's perspective. In addition, age was distinctly different for Judith, she is younger than the others, and Harry, he is older than the others.

Paul (defined by the views of 51 police officers)

My name is Paul and I am 38 years old. I have been a police officer for 14 years, roughly the average number of years of service for the Dutch Police Force as a whole (Appendix 4.1). When I compare my answers with those of my colleagues I realize that I appreciate the **ICT support service** (rank score +3) and **assistance with use of systems** (rank score +3) more than others. It appears that I am on the other end of the spectrum when it comes to **the number of systems** (rank score -3) and **system sign on** (rank score -3), as I appreciate considerably less those aspects of the way things are done now (see Table 4.4).

Figure 4.3 What Paul appreciates most and would like to see more of.

I really appreciate having the support of my colleagues, both the ones I work with most closely day-to-day and those on whom I can call in a pinch, like the ones in the ICT support unit "*If there is something that I cannot figure out there is always someone who can help, sometimes it is someone in my own area, sometimes a BVH system specialist or a content administrator.*" I feel the same way about my colleagues working in ICT support. "*The service provided by*

them is always good, just give them a call and they are ready to help, for example, if you need a hand with a system reset, or if you forget the password for a specific system. That is very convenient." I would like to see in the near future the number of systems reduced. "*It would be ideal if all of the systems could be integrated.*" Of course, I know this would be a very difficult task to achieve, but it would already be a help if some of the systems were. "*Maybe more connection between systems like BVO, BVH, BVCM and travel expenses.*" I would also like to see system sign on made easier. "*As I am a coordinator I have to constantly switch between systems for data-entry and searches.*" As it is now, doing that calls for separate sign-ons. "*It would be great if I could sign on just once for Citrix and other technologies for instance, and then all the other ones could be used without signing on again.*"

Judith (defined by the views of 18 police officers)

At 33 I am among the youngest police officers in the Dutch Police Force, and I have already been on it for 11 years. Not surprisingly that is less than the average number of years of service on the force (see Appendix 4.1). I see that, like Harry, I have a notably higher appreciation for **search systems** (rank score +3) I am happier with the **number of systems** (rank score +3) and with **sharing data with colleagues** (rank score +3) than the others. At the same time, my appreciation of **mobile working** (rank score -3) is considerably lower than that of the others (see Table 4.4).

Figure 4.4 What Judith appreciates most and would like to see more of.

I really appreciate the ability I have with the ICT systems to carry out searches to find the information I need to do my job. "*Search tools like BVI-IB and BlueView work really well.*" "*Just one example of how search tools help me is that once I needed to know if a suspect was in custody. I knew the suspect had been transferred to another region. Using BVI-IB I found the answer in an instant.*" In contrast to Paul, I appreciate that there are a number of systems. "*It is important to have as much information as possible.*" I appreciate having the ability to share data too. "*With one click you can let your colleagues know that a change which might concern them has taken place. These kinds of functions really help to keep us all up to date.*" What I would like to see more of in the future is ICT mobility. "*Systems available in the office are also becoming available on the streets.*" "*It would be very nice if we could, for example, use I-pads on the street with content like images or giving the precise location.*" This kind of technology has not been made available here so far. I hear from colleagues from other policing regions, that they already have such mobile technologies. "*[They have] much more flexibility … BlackBerry and BVI-IB applications.*" It would be very helpful for us to have it. What would I like to see in the future? "*The ability to use new media, for example, to be able to easily deploy images and content from social networks like Facebook and Twitter.*"

Rose (defined by the views of 33 police officers)

I am 38. I have been on the force for 14 years, like Paul, just about the average (see Appendix 4.1). I see that compared to Paul, Judith and Harry, I have a higher appreciation for the current **system sign on** (rank score +3). I see **navigating the systems** (rank score -3) somewhat less positively than the others. There is also a big difference between me and the other three on how we feel about **focusing on the user** (rank score -2), and me and two others on **searching the systems** (rank score -2) are considerably lower than the others' appreciations.

The reason I appreciate so highly system sign on, while Paul does not, is that the technology I am given to use enables a single sign on. "*Sign on once and you are set to go.*" I like systems that can anticipate my next move. I do not have that now, so I cannot say that I am happy with the current way of navigating the system. "*Systems should be able to 'think', anticipate the next step the user is likely to take.*" I think what is called for is more focussing on the user when designing ICT. I believe that would greatly increase the ease with which we can go about navigating the systems. It would be better than now. "*The system takes centre stage instead of the user.*" Finally, unlike Judith, I do not yet have the BVI-IB search tool. From what I have heard this technology could benefit me greatly. I would really like to perform what is called 'free text search' and to see all of the possible links having to do with specific cases 'in the blink of an eye' as they say. Only those who are in regions that have BVI-IB already can do what I want to be able to do.

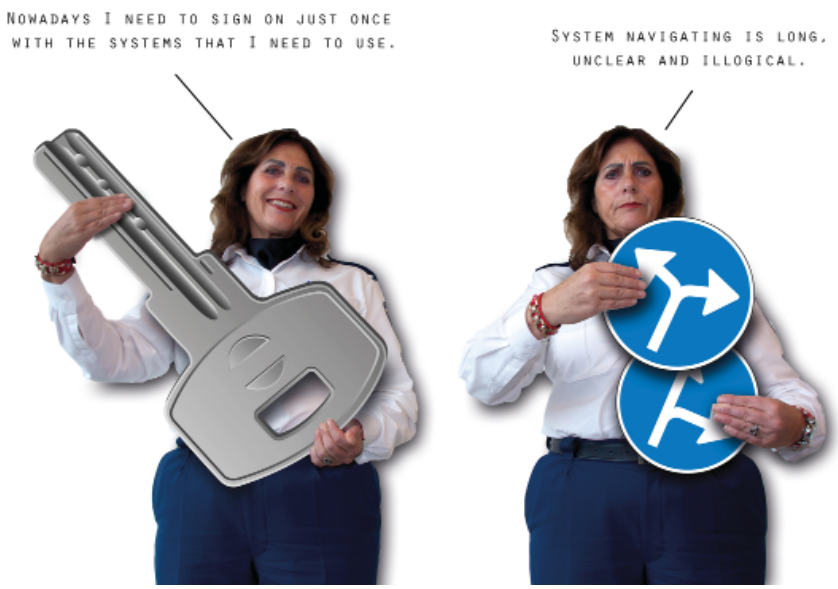


Figure 4.5 What Rose appreciates most and would like to see more of.

Harry (defined by the views of 10 police officers)

At 47, I am amongst the older police officers. I have been on the force for 22 years. I know my way around the organization and around the ICT I use to get my job done (see Appendix 4.1). In contrast to Paul Judith and Rose, I have high regard for the current **search systems** (rank score +3). This said, I am much less happy than the others with **coherence between systems** (rank score -3) and the **ICT support service** (rank score -3).

The main reason I am so very appreciative of the current search systems is because I work a lot with them. "*I have always been seen as the systems wizard.*" "*I know how to find lots of information.*" While Judith and I both appreciate the search systems, we differ in that she stresses the ease with which information can be found using relatively new technologies. What I would like to see more of is an increase in the coherence between systems. "*Integrating the BVH and LSV systems would be helpful in preventing double data-entry. The way it is now, I have to enter the same data three times. Working with the public prosecutor is labour-intensive because files still need to be printed and scanned and so on. The information exchange could – and should – be electronic.*" Let me end by saying that I cannot go along with Paul's highly positive view of the ICT support service. It is too bureaucratic. "*I would like the ICT team to concentrate on becoming more knowledgeable, instead of focussing on creating tickets. I also*

think that they are good intentioned], and yet they often find themselves with their backs against the wall because they lack specific system knowledge."

Figure 4.6 What Harry would like to see more of.

5. CONCLUSIONS

We undertook this study to help increase understanding within the Dutch Police Force of what police officers value about the ICT they use to do their jobs, and what they think needs to be improved. Our ultimate goal was to enhance ICT development decision making. Have we been successful?

We believe that by using AI and QM together we have reached our goals. A big step forward was made the day we communicated the findings of this study to administrators, technicians, and project managers who had up to that point decided on their own ICT for the Dutch Police Force. We anticipated that those stakeholders would react with resistance if we presented the perspectives of police officers framed in a problem-oriented approach using negative language. We did not do that. We delivered their messages in a solution-oriented way and in positive language. In short, we carried through on our AI approach. The constructive way we went about relating what we had found, bolstered by a visual presentation (using in part Figures 4.2 to 4.5) with a touch of humor, was well received. In the months following, incremental changes

were made. Some follow-up projects got underway, one meant to improve ways of working with multimedia files, another to improve interoperability between two major operational information systems. The ICT support service unit began to look into why there was so much variation in how the unit was seen as a starting point for improving service provision.

What about the way in which the study was carried out? The combined AI-QM approach we took was especially fruitful in the analysis and interpretation phases because of its ability to combine quantitative and qualitative data. In general, the combined AI-QM interviewing approach made it pleasant for interviewers and interviewees alike. Questions were asked, and responded to, in ways both constructive and efficient. It is worthy of note that the appreciative questions we posed during the interviews were by and large responded to in equally positive ways. Some interviewees did, however, consistently answer in a negative vein, and persisted to do so despite efforts on the part of interviewers to steer the interview to more positive ground. After reflecting on this, we conclude two things. First, it is important that interviewers be trained in techniques that can help keep the AI spirit alive throughout an interview. For instance, interviewers can learn how to develop alternative phrasing of unconditional appreciative questions in an attempt to move toward more constructive discourse. Second, the few interviewees who did not respond in a positive way to repeated appreciative questions could hardly be forced to do so. The only thing that interviewers could do was to accept the answers given in the way they were.

This study has strengthened the intention of the top management of the Dutch Police Force to develop a new information architecture for the force, and for police officers to have a more prominent role in ICT development. The CIO has also determined that it would be beneficial for police officers to have a prominent and sustained role in ICT implementation. We see this as proof that this study was both practical and generative. Moreover, we have now been engaged to help implement for ICT: an overall- and project effectiveness measure, through end-user evaluations. Such evaluations are inspired by IS success models (DeLone & McLean, 1992; Petter et al., 2008), and developed in the technology acceptance literature (Davis et al., 1989; Venkatesh et al., 2003). Effectiveness measures are an objective complement to the more subjective AI-QM study presented in this paper. We will continue to track how police officers view ICT.

We return to the question of whether we have been successful. We have according to the definition given by Bushe (2013:89) "*new images, metaphors, physical representations, and so on that have two qualities: they change how people think so that new options for decisions and/or actions become available to them, and they are compelling images that people want to act on.*"

6. DISCUSSION

We discuss here the value of a combined AI-QM approach for consultants and strategic managers, as well as this study's implications for the IS researcher interested in AI. Our experience leads us to recommend a combined AI-QM approach to investigate how a given topic is perceived by a variety of stakeholders with the goal of uncovering alternative futures, regardless of the possibility of cynicism on the part of any of the stakeholders.

Future ICT development research and practice might benefit from combining the capabilities of AI (whole systems, holistic development) and Agile's (small group methodology, isolated development) to develop a methodology sensitive to simultaneously coordinating multiple stakeholder views about ICT development on an organizational level – a strength of AI, and at the same time to the complexities of timely ICT development – a strength of Agile. This could help resolve, or at least increase understanding of one of Agile's most pressing issues: the coordination of agile development at an organizational level (Abrahamsson et al., 2009; Cao et al., 2009).

We found QM techniques uniquely suited to bridging the classic distinction between qualitative and quantitative techniques of data-collection, i.e. surveys and interviews, and data analysis, i.e. cluster-analysis – content analysis/grounded theory, in order to study shared perspectives. QM can yield the rich, holistic data, needed to perform a sound AI. Take for example the Q-sort interview, the QM technique for collecting data. Q-sort interviewing combines the central strengths of the conventional questionnaire (quantitative) and the interview (qualitative), while mitigating their potential weaknesses. Questionnaires provide structure and rigor to data-collection. On the down side, data wholeness can be easily lost, because individuals respond to particular items, and because the resultant data often lacks empirical richness as questionnaires include closed questions with predefined answers. Interviews, on the other hand, provide wholeness and richness, but can be said to lack structure and rigor because of their subjective procedures for data-collection. Falling between the two, a Q-sort interview can simultaneously provide structure, rigor, wholeness and richness. The Q-deck provides structure, like a questionnaire, while ensuring wholeness because respondents sort all of the statements in the Q-deck as to how they relate to one another, rather than responding to each particular item in isolation as is typical with questionnaires. Furthermore, empirical richness and rigor in coding is assured, because respondents assign meaning to particular statements. QM can thus be very helpful for the study of inter-subjectivity, as shown in this AI. Lastly, after carrying out this combined AI-QM study we subjected the items to a Likert-type panel study (n=911), which produced similar results, meaning that our sampling for diversity approach led to representative findings for the population of police officers as well (KPMG, 2013).

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Appendix 4.1 Participant descriptives

Table A4.1 Distribution of the kinds of duties performed by participants

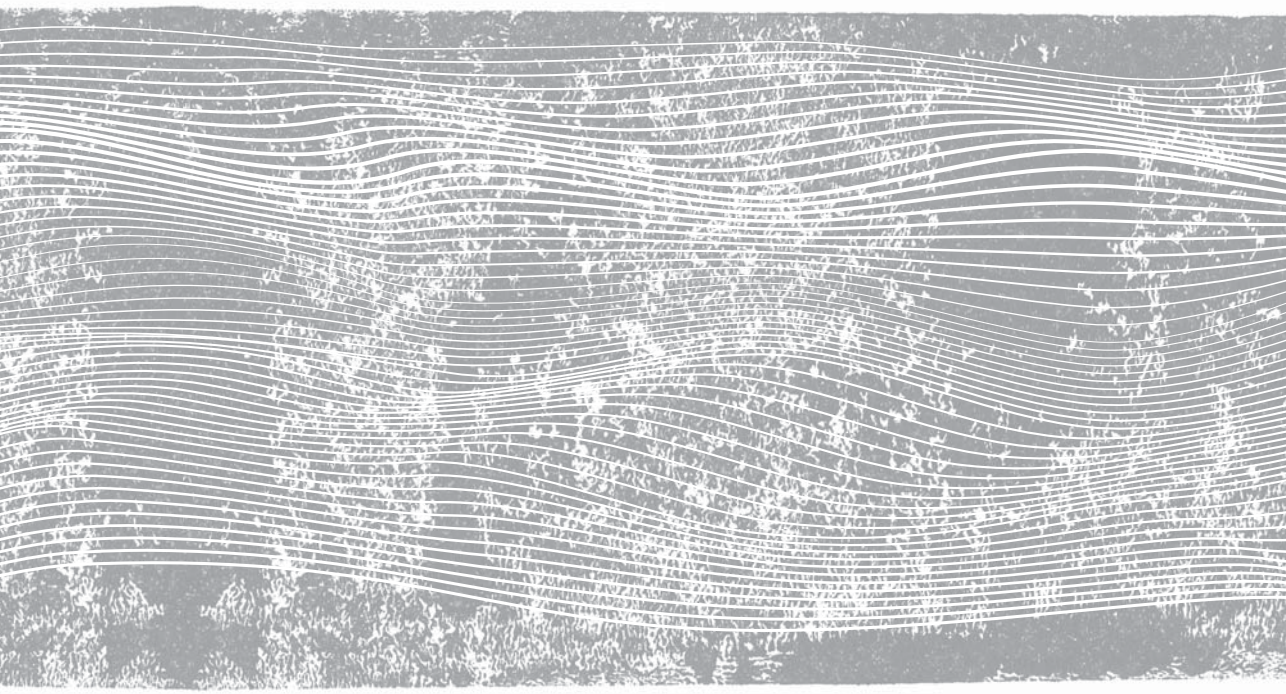
Policing work process	Frequency	Percentage
Community policing	39	23.9
Direct assistance	65	39.9
Criminal investigations	33	20.2
Intake & service	26	16.0
Total	*163*	*100*

Table A4.2 Distribution of age and years of policing experience

	Minimum	Maximum	Mean	Standard deviation
Age	19	63	39.03	11.38
Work experience	1	46	12.73	11.46

Chapter 5

How anchoring and adjusting influence citizens' acceptance of video-mediated crime reporting: a narrative approach[1]



[1] A modified version of this chapter appeared as: Hoefnagel, Oerlemans, Goedee (2014). How anchoring and adjusting influence citizens' acceptance of video-mediated crime reporting: a narrative approach. Journal of Strategic Information Systems, 23 (4), 305-322.

ABSTRACT

This study aims to deepen our understanding of specific processes influencing technology acceptance. To reach this goal, we developed a process model from 36 narrative interviews taken from citizens who had their first experience with crime reporting through video-mediated communication technology. Two major findings emerged. Firstly, we observed that the selective accessibility processes of anchoring and adjusting influence citizens' acceptance of video-mediated crime reporting. Secondly, we found citizens to evaluate this technology primarily on its affective merits, that is, on its social presence. This latter finding complements the current reliance on cognitive predictors in the technology acceptance literature. The former finding complements the reliance on specific beliefs in current technology acceptance literature, because this study finds that actual acceptance of this virtual technology is influenced by citizens' reliance on their generally held beliefs; their anchoring. The implications of these findings for the study of technology acceptance research are discussed, in particular for technologies mediating both human- and artificial social actors in related (public) service provision settings.

1. INTRODUCTION

In November 2009 a woman and a man arrived together at a police station in the major port city of Rotterdam. The automobile of the two life-long residents had been broken into and they were quite upset by this event. The police station where they had come to file a report had a newly installed, still-experimental 3D video-mediated communication (VMC) system that promised to save on resources by pooling them at a central facility while still delivering services on-site. They were invited to use the system to file a report in a virtual way. Neither she nor he was familiar with computerized technologies. They had had little experience with them on-the-job before retirement, and had no computer at home. At 70 and 72 on a day that had already been stressful, they were about to step into a room, and in so doing they would enter a world of technological possibilities that they could never have imagined. Once the report had been filed the two were asked if they would meet with someone interested in hearing about their experience. Both readily agreed.

Although clearly still somewhat affected by the burglary, the woman in particular seemed to have enjoyed the VMC experience, to have found it entertaining. She volunteered that she had been really surprised.

> Interviewer: *" … so you were surprised, can you tell me something more about that?"*

> Interviewee: *"I was thinking, where is she [referring to the police officer whose 3D image had been projected onto the screen], where can she be? Then she said to me, 'I am somewhere else!' But it was so real, as if she could at any moment walk out from behind that screen. [The interviewee laughs.] "Yes, I found it beautiful, honestly. I asked her if she could actually see me. She said, 'Yes I can, you are wearing a red coat!" [The interviewee laughs again.]*
>
> Co-Interviewee: *"You get used to it pretty fast."*

Video-mediated communication (VMC) makes it possible for a police officer physically located at a central call center to be virtually present to take information about crimes from members of the public at any one of 17 different locations in Rotterdam. The taking of reports in a virtual way has real potential for personnel cost savings (Politie, 2010). During the exchange from which the above excerpt is taken the interviewee never refers to concepts of technology acceptance, nor mentions virtuality, video-mediated communication or the provision of public services. This does not mean that that interviewee, and others who agreed to be interviewed about their first-hand experience with VMC, had nothing to say about it. Their reactions are important to researchers and practitioners alike because they can provide new and different insights on the processes that lead to acceptance of new technologies. That is why we pose the following research question: *What processes influence citizens' acceptance of the provision of a public service in a virtual way?*

We use Lee's (2004:38) definition of virtuality, "the sensory or non sensory experience of a para-authentic or artificial object,"[1] and Van de Ven's (1992:170) definition of process as a "sequence of events or activities that represent underlying patterns of attitudinal transitions by an individual in dealing with new technology". Our intention is to isolate patterns that explain how and why the use by the police of video mediation in the taking of a crime report is accepted or not accepted by members of the public, and by extension why the delivery of public services using VMC may or may not be accepted. We took a narrative research strategy, because it is an appropriate research approach for the discovery of processes, in this case from the perspective of the citizens involved. In this paper we will relate what 36 participants had to say about their VMC experience. We invited them to tell us about it in their own words, to speak freely, and they did. Only after they had had their say did we attempt to elicit more from them. The narrative-interviewing technique we adopted put the interviewees in charge (Jovchelovitch & Bauer, 2000).

This study is theoretically relevant for several reasons. First, it is at this exciting intersection of the *strategic intent* of cutting costs while maintain customer intimacy and service quality, and *technology acceptance* of its end-users, that this study wishes to contribute (Arvidsson

et al., 2014). We do so by studying a potentially disruptive type of technology for the way public services are provided to citizens. It has been generally acknowledged that acceptance of technology by the intended end-users, is a key strategic asset for organizations (Walsh, 2014). This is also the case for the virtual technologies like the one studied here, which is of increasing strategic interest. Especially in the current timeframe where government agencies continue to face budget cuts, while expected to maintain customer intimacy (Treacy & Wiersema, 1995) and provide high quality services to demanding users. The full potential of virtual public services is however not limited to individual organizations, or intra-organizational constellations but might even affect societies at large in the near future. Second, this contributes by looking into possible mechanisms influencing the acceptance of video meditated communication in the provision of a public service, itself a relatively new application of that technology on which little research has been done until now. Lastly, in the empirical part of this study we take a process approach to studying technology acceptance by individuals, which also finds ample application in today's study of technology acceptance (Currie, 2004; Pare et al., 2008). We do so by exploring the two processes of anchoring and adjusting, originally two decision making heuristics studied in human decision making with high levels of uncertainty (Tversky & Kahneman, 1974).

This study also has immediate practical relevance. It has long been assumed that virtual technology use can yield cost savings when it is advantageous to deliver services from a centralized facility and possible to maintain a sufficient level of intimacy during the provision of services[2] (Treacy & Wiersema, 1995). We show a use of VMC that can indeed yield cost savings, and at the same time yields positive responses from the citizens involved in this service provision. This makes our study of interest to researchers as well as to practitioners in both the private and the public sector, but especially for those charged with the delivery of public services. Lastly, taking a narrative approach also enabled us to provide a rich context from which to provide invaluable information for future implementation strategies of similar technologies, which we address in the discussion section of this paper.

This article is structured as follows. First, we provide a brief overview of current technology acceptance research, which serves as a springboard for this study's fieldwork as well as a point of reference to discuss the implications of this study's findings. Next, we set the stage for our fieldwork introducing the research context, technology and the methods used. We present our analysis of the responses of the participants in our study to the delivery of a public service virtually. In the discussion section we explore the implications of this study's findings for future technology acceptance research in general and of the acceptance of virtual technologies in particular. We end this paper by discussing this study's implications and providing recommendations for practice.

2. PROCESSES LEADING INDIVIDUALS TOWARDS TECHNOLOGY ACCEPTANCE

In this section we provide an overview of empirical research concerning technology acceptance by individuals. These insights serve as both a springboard for this study's fieldwork, as well as a point of reference to discuss the implications of this study's findings. We do so by presenting both a brief overview of the explanatory factors proposed in the empirically validated variance models of technology acceptance models, as well as a review of empirical studies taking a process perspective on technology acceptance. We conclude this section by formulating the main conclusions we draw from this brief overview. We start with defining process- and variance oriented research.

Variance - and process research

In making a distinction between process (PRM) and variance (VRM) models we rely on prior work of Mohr. According to Mohr (1982), theoretical advances in any social science can be made by using two types of research models: a variance research model (VRM), also referred to as a factor study, or a process research model (PRM). Perhaps the most significant difference between the two is that variance research sees outcomes as a function of causal factors but does not attempt to empirically track the processes by which these factors yield outcomes, while process research attempts to do just that (Mohr, 1982). In other words, VRMs assume that certain theoretical mechanisms are at work, i.e. the processes (how and/or why) by which independent and dependent variables are related, and PRMs focus on those very processes and mechanisms. Newman and Robey (1992:250) write that VRMs should be:

> *" … structured to conceive of predictors as factors that vary in degree or intensity. The basic assumption is that variation in these predictor (or independent) variables accounts for variation and thus explanation in outcome (or dependent) variables."*

PRMs on the other hand "focus on sequences of states and events over time in order to explain how and why particular outcomes are reached" (Newman & Robey, 1992:251). Mohr (1982) distinguishes between VRMs and PRMs analytically and provides a summary of their four distinguishing characteristics (see Table 5.1).

Table 5.1 Characteristics of variance and process models From Mohr (1982:38)

Variance model	Process model
The basis of explanation is causality	The basis of explanation is probabilistic rearrangement
1. The precursor (x) is a necessary and sufficient condition for the outcome (Y)	1. The precursor (x) is a necessary condition for the outcome (Y)
2. Variance model deals with variables	2. A process model deals with discrete states and events
3. A variance theory deals with efficient causes	3. A process theory deals with a final cause
4. Time ordering among the independent variables is immaterial to the outcomes	4. Time ordering among the contributing events is generally critical for the outcome

Technology acceptance by individuals: the variance perspective

In providing an overview of the factors impacting on technology acceptance emerging in the current variance models of technology acceptance by individuals, we draw on the work by Venkatesh et al. (2003). The major variance research models of technology acceptance, as well as the core predictors of the prevalent, are summarized in Table 5.2.

The theories that have informed the main models identified by Venkatesh et al. (2003) are Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA); Ajzen's (1985; 1991) Theory of Planned Behavior (TPB), and Rogers' (1983) Innovation Diffusion Theory (IDT). The models listed in Table 5.2 share at least four main characteristics. First, they aim to predict the acceptance and use of a technology; hence the processes and theoretical mechanisms by which technology acceptance comes about are assumed and not modeled. Second, they see intention to use as an important predictor of actual behaviors. Third, they focus solely on an individual's specific beliefs about the technology to be accepted; hence little attention is paid to the role more general beliefs, like for example general self-efficacy (Agarwal et al., 2000), might play in an individual's technology acceptance judgment. Fourth, they focus more on cognitive and conative/intentional predictors than on affective ones (Ajzen, 2005). This last statement requires some clarification. It is widely accepted that whether an individual has a favorable or unfavorable attitude toward a given technology is determined by that individual's cognitive, affective, and conative responses. Cognitive responses reflect personal perceptions and beliefs and affective responses emotions and feelings, while conative responses have to do with willingness, in other words what individuals themselves expect they will do in the future (Ajzen, 2005; Short et al., 1976). Following Ajzen (2005) and Fishbein and Ajzen (1975), we indicate in Table 5.2 whether a given predictor is cognitive (COG), affective (AFF) or conative (CON). This allows us to judge the relative importance of cognitive vs. affective predictors

for the adoption of a given technology, in our instance virtual technology. Between the eight technology acceptance models listed in Table 5.2, we count 6 affective, 25 cognitive and 2 conative constructs. It goes beyond the scope of this paper to review all acceptance models listed in table, but we wish to highlight one: The Unified Theory for the Acceptance and Use of Technology (UTAUT).

UTAUT: a landmark technology acceptance variance model

Recognition of the fact that there were a number of competing technology acceptance models, and yet none was by itself complete, gave rise to a unified model. Not only did Venkatesh et al. (2003) incorporate the central premises of the seven leading technology acceptance models into a new, unified one, but they then empirically showed it to have superior predictive power. In UTAUT, the attitudinal beliefs of users and would-be users about performance and effort have an impact on the intention to use a certain technology, and so actual use, and that intention and use are likewise impacted by other social actors and facilitating conditions (Appendix 5.1). According to the UTAUT model these relationships are moderated by gender, age, experience, and voluntariness of use. Currently, UTAUT seems to be the landmark variance model for the study of technology acceptance by individuals, because UTAUT has demonstratively the most predictive power (Venkatesh et al., 2003), has been repeatedly cited, empirically validated (Li & Kishore, 2006; Oshlyansky et al., 2007), and extensively used across a broad range of (related) applications from robot companions for persons suffering from dementia to Internet radio quality and e-government (Welmers, 2005; Heerink et al., 2008; Schrijver, 2008).

Technology acceptance by individuals: process perspectives

The body of empirically oriented technology acceptance process research is much smaller than the variance literature. We find general support for our observation with Pare et al. (2008), who state that 21 percent of all IT impact studies take a process perspective, whereas 79% is variance oriented. In addition, Currie (2004) already observed that process oriented IT impact studies are rarely empirical, let alone take the individual as the unit of analysis and object of observation as we take in this study.

Beaudry and Pinsonneault (2005) provide a rare, yet illustrative, example of an empirical process research study taking the individual as its level of analysis. Using insights from general coping theory, they build a coping model for technology adaptation in organizations by its end-users. Following Beaudry and Pinsonneault, the coping process starts with primary appraisal ("Is the technological event an opportunity or a threat for me?") and secondary appraisal ("Do I have high/low control over this technological event?"). These sequential processes result in one of

Table 5.2 Overview of acceptance models from Hoefnagel, Oerlemans, and Goedee (2012: 7-9)

Theory/model (major contributor)	Fundamental premise	Core constructs
Theory of reasoned action [TRA] (Fishbein & Ajzen, 1975)	Individual behavior is driven by behavioral intentions which comprise attitude and social norm	Attitude towards behavior: 'an individual's positive or negative feelings (evaluative affect) about performing the target behavior' (Fishbein & Ajzen, 1975:216) **(AFF)** Subjective norm: 'the person's perception that most people who are important to him think he or she should or should not perform the target behavior in question (Fishbein & Ajzen, 1975:302) **(COG)**
Theory of planned behavior [TPB] (Ajzen, 1985; Ajzen, 1991)	Extension of TRA; perceived behavioral control is added to TRA as a predictor of individual behavior	Perceived behavioral control: 'the perceived ease of difficulty of performing the behavior' (Ajzen, 1991:188) in IS research; 'perceptions of internal and external constraints on behavior' (Taylor & Todd, 1995) **(COG)**
Innovation diffusion theory ([DT] (Rogers, 1983; Rogers, 1995; Moore & Benbasat,1991)	Individuals possess different degrees of willingness to adopt innovations	Relative advantage: 'the degree to which an innovation is perceived as being better than its precursor' (Moore & Benbasat, 1991:195) **(COG)** Easy of use: 'the degree to which use of an innovation is perceived to enhance one's image or status in one's social system' (Moore & Benbasat, 1991:195) **(COG)** Image: 'the degree to which one can see others using the system in the organization' (Moore & Benbasat, 1991:195) **(COG)** Compatibility: 'the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adapters' (Moore & Benbasat, 1991:195) **(COG)** Results demonstrability: 'the tangibility of the results of using the innovation, including their Observability and communicability (Moore & Benbasat, 1991:203) **(COG)** Voluntariness of use: 'the degree to which use of the innovation is perceived as being voluntary, or of free will' (Moore & Benbasat, 1991:195) **(CON)**
Technology acceptance model [TAM / TAM2] (Davis, 1989; Bagozzi et al., 1992)	When users are confronted with a new technology, a number of factors influence their decision about how and when they will use	Perceived usefulness: 'the degree to which a person believes that using a particular system would enhance his or her job performance' (Davis, 1989:320) **(COG)** Perceived ease of use: 'the degree to which a person believes that using a particular system would be free of effort' (Davis, 1989:320) **(COG)** Subjective norm: As in TRA **(COG)**

Table 5.2 ***Continued***

Motivational model [MM] (Vallerand, 1997; Davis et al., 1992; Taylor & Todd, 1995)	Behavior can be motivated intrinsically or extrinsically	Extrinsic motivation: 'the perception that user will perform an activity 'because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself, such as improved Job performance, pay, or promotions'' (Davis et al., 1992:112) **(COG)** Intrinsic motivation: 'the perception that users will want to perform an activity for no apparent reinforcement other than the process off performing the activity per se' (Davis et al., 1992:111) **(COG)**
Model of PC utilization [MPCU] (Triandis, 1977; Thompson, 1991)	Derived from Triandis' theory of human behavior (Triandis, 1977) Thompson (1991) argues that utilization is affected by social factors, affect, perceived consequences and facilitating conditions	Job-fit: 'the extent to which an individual believes that using (a technology can enhance the performance of his or her job (Thompson et al., 1991:129) **(COG)** Complexity: 'the degree to which an innovation is perceived as relatively difficult to understand and Use' (Thompson et al., 1991:128) **(COG)** Long term consequences: 'outcomes that have a pay-off in the future' (Thompson et al., 1991:129) **(COG)** Affect towards use: 'feelings of joy, elation, or pleasure, or depression, disgust, displeasure, or hate associated by an individual with a particular act' (Thompson et al., 1991:127) (AFF) Social factors: 'the individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific situations' (Thompson et al., 1991:126) **(COG)** Facilitating conditions: 'objective factors in the environment that observers agree make an act easy to accomplish' (Thompson et al., 1991:129) **(COG)**
Social cognitive theory [SCT] (Bandura, 1986; Compeau & Higgins, 1995)	Human behavior is seen as an interaction of personal factors, behavior, and the environment	Outcome expectations performance: 'the performance-related consequences of the behavior' (Compeau & Higgins, 1995) **(COG)** Outcome expectations personal: 'the personal consequences of the behavior' (Compeau & Higgins, 1995) **(COG)** Self-efficacy: 'judgment's of one's ability to use a technology to accomplish a particular job or task' **(COG)** Affect: 'an individual's liking for a particular behavior' **(AFF)** Anxiety: 'evoking anxious or emotional reactions when it comes to performing a behavior' **(AFF)**
Unified Theory for Acceptance of Technology [UTAUT] (Venkatesh et al., 2003)	Based on theories above, use behavior is determined by personal evaluations, personal attributes, social influence and facilitating conditions	Performance expectancy: 'the degree to which an individual believes that using the system will help him or her to attain gains in job performance' (Venkatesh et al., 2003:447) **(COG)** Effort expectancy: 'the degree of ease associated with the use of the system' (Venkatesh et al., 2003:450) **(COG)** Attitude towards using technology: 'individual's overall affective reaction to using a system' (Venkatesh et al., 2003:455) (AFF) Behavioral intention to use the system: 'not defined' **(CON)** Facilitating conditions **(COG)**, anxiety **(AFF)**, self efficacy **(COG)** & social influence **(COG)**: similar to MPCU

AFF = affective predictor, COG = Cognitive predictor, CON = conative predictor or predicted

four adaptation strategies. When a technological event is perceived as an opportunity, either a benefit maximizing (high control) or a benefit satisficing (low control) coping strategy is chosen. When a technological event is perceived as a threat; either a disturbance handling (high control) or self-preservation (low control) coping strategy is selected. Lastly, these strategies generate one or more of the following outcomes: (increased) individual effectiveness and efficiency, a minimization of the negative consequences of the IT event, restoring personal emotional stability, and lastly exit.

Venkatesh (2000) firstly proposed the sequential processes of anchoring, a reliance by IS-users on general beliefs, and adjusting, a selective reshaping of beliefs following direct user experience, as processes explaining why and how technology acceptance takes place. He conceptualized anchors and adjustments as predictors for perceived ease of use, therewith extending the technology acceptance model (a variance model). Although anchoring and adjusting have found no further exploration since their introduction by Venkatesh, nonetheless these concepts are especially useful in explaining attitudinal responses in situations where individuals have no specific previous knowledge on which to rely on, as is the case when confronted with new (applications of) technology. Anchoring and adjusting first emerged as decision heuristics (Tversky & Kahneman, 1974), in those situations in which individuals will first rely on whatever general information they may have and this information subsequently serves as an anchor. If additional, specific information becomes available, for example through first-hand experience with VMC, individuals will tend to adjust their initial judgments in the light of the newly acquired information. An individual will, nonetheless, still rely on the initial anchoring criteria to some extent (Slovic & Lichtenstein, 1971; Tversky & Kahneman, 1974). Since the seminal work of Tversky and Kahneman, decision scholars have enriched and validated these heuristics in laboratory settings (Jacowitz & Kahneman, 1995) and also in the field, often taking a processes perspective (Mussweiler & Strack, 2004; Epley & Gilovich, 2006). Relying on empirical decision making research, Mussweiler (2003) proposes a process model (Figure 5.1) in which the current state of the art knowledge of the anchoring and adjusting processes is embedded.

This process model tells us that when an individual decision-maker has to make a decision under uncertainty, that individual starts anchoring, meaning that he/she makes a general assessment of the target-standard similarity by briefly considering the salient features of the target and the standard (Mussweiler, 2003). In the context of virtual crime reporting, for example, VMC would serve as the so-called target, whereas face-to-face communication comprises the standard for citizens. When this first assessment results in high similarity between the target and the standard, subsequent adjusting will take form as a process of similarity testing because individuals evaluate hypotheses by trying to confirm them (Klayman & Ha,

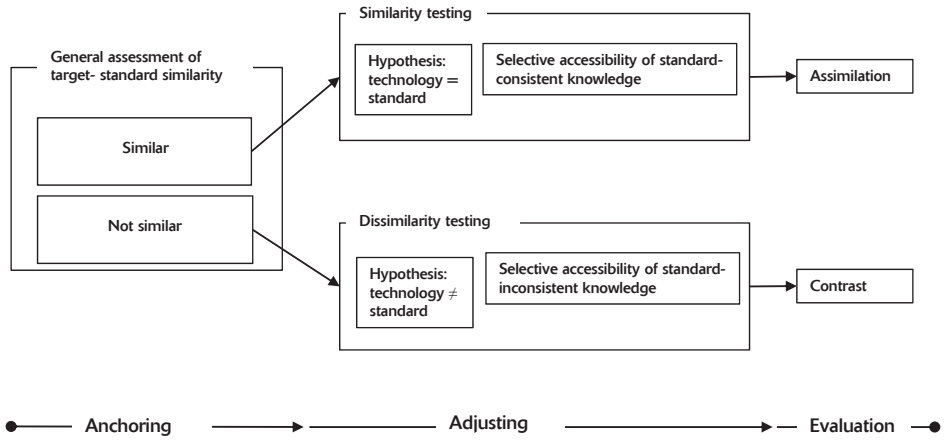


Figure 5.1 Anchoring and adjusting as selective accessibility mechanisms (Adapted from: Mussweiler, 2003:475).

1987). When taking this adjusting strategy, an individual's test hypothesis is formulated as 'the target is the standard' and subsequently selective/confirmatory search takes place for standard-consistent target knowledge, resulting in assimilation. By contrast, when anchoring yields few similarities between target and standard, an individual's adjusting is a process of dissimilarity testing, again because individuals evaluate hypotheses by trying to confirm them (Klayman & Ha, 1987). When taking this adjusting strategy, the individual test hypothesis is formulated as 'the target is not the standard' and the individual will selectively search for standard inconsistent target information, resulting in contrast. So, in both adjustment processes it is the initial anchoring, a general comparison of the salient features of both standard and target that determines the kind of adjusting (similarity – dissimilarity testing) and the resulting target evaluation (assimilation – contrast) (Mussweiler, 2003).

3. SETTING THE STAGE: CONTEXT, TECHNOLOGY AND METHODOLOGY

In this section we set the stage for our empirical study. We relate the context, describe the features of the Rotterdam VMC system, and outline our methodology.

Research context: taking a crime report

Tucker, Baum and Singh (1992:47) describe a human service organization (HSO) as "a non-market form of organizing, which is mainly concerned with changing, constraining and/or supporting human behavior." Recipients of the services provided by such organizations expect not only responsiveness to their needs but also concern and commitment on the part of those who deliver the services (Hasenfeld, 1992: 3). Despite such positive expectations, they may experience contradictory emotions, be hopeful or fearful, feel they are treated with dignity or abused, cared for or victimized (Hasenfeld, 1992:4). The taking of a report by the police is a public service provided by a governmental agency, and the reactions described by Hasenfeld (1992) are often seen during the process. A study carried out by the Dutch Ministry for Interior and Kingdom Relationships (2005) into public perceptions of the police concluded that persons reporting a crime not uncommonly express outright, or show signs of, anxiety or anger, are clearly eager to share what they experienced, and appear to want the officer to whom they relate what has happened to be cordial, concerned and sympathetic. The taking of a police report virtually, then, is an ideal context in which to study the provision of a human service using VMC. In the following section we describe the conventional way in which crime reports are taken, then how and why virtual crime reporting can be a desirable alternative.

Conventional crime reporting

Rotterdam has a large, diverse population of its own, and as Europe's busiest cargo port it also has a constant stream of temporary inhabitants. Anyone of them can report a crime at one of the city's 24 police facilities. For some time the Rotterdam police have used the same tried and true way of handling the reporting of a crime, a way not unlike that of most police authorities across Europe. Reports are taken in private, face-to-face in an office-like setting, the filer on one side of a desk, an officer on the other, the officer using a text-based information system to record then store pertinent information.

The reporting of a crime can be an emotionally charged situation. Officers meeting with persons reporting crimes require special training, and for their own safety, an armed officer is always nearby. The staffing and training costs directly associated with the taking of a police report,

and the opportunity costs of devoting time to report-taking that might have been spent on crime prevention and investigation, are considerable.

Virtual crime reporting

Is there a more cost-effective way for the police to take reports and yet not compromise the service offered filers? There may well be. Information and communication technology (ICT) has advanced to the point that there now exists, sophisticated, virtual presence technology that can transmit sound and holographic 3-D images so clearly and reliably that it is believed that little of the intensity of meeting face-to-face is lost. If this is true, then the Rotterdam police authority can pool personnel specializing in tasks like the taking of a crime report at one location rather than having especially trained officers and back-up staff at each locale across the city where a crime report can be filed. Would a €3 million, one-time investment and approximately 400,000 spent annually on a virtuality, mediated communication system be worth it? The Rotterdam police thought so, and a recent case study shows that their decision to go-virtual saves 4.5 million a year (Politie, 2010).

Video mediated communication (VMC)

Video-mediated communication (VMC), as the name implies, is communication facilitated by a video signal (Finn et al., 1997). For nearly five decades industry, academia, government agencies, and the military have embraced subsequent generations of VMC, yet its full promise glimpsed at the World's Fair in 1964, remained elusive. While video-conferencing and long-distance learning were readily adopted, the inability of VMC to capture a sense of real human contact continued to be a disappointment (see Egido, 1990 for a review of the possibilities and limitations of VMC). In the early 90s O'Conaill et al. (1993) concluded that the most advanced VMC systems of the time were simply not capable of replicating face-to-face meetings, but they also found that the participants in long-distance meetings behaved more naturally when a more sophisticated, practically time lag-free, broadcast-quality VMC system was used as it delivered a more face-to-face-like experience. In the intervening years a number of researchers considered the effect of VMC technology on the communication process (Cook & Lalljee, 1972; Doherty-Sneddon et al., 1997), and then VMC from the user's perspective (Welmers, 2005; Heerink et al., 2008; Schrijver, 2008). This study too focuses on the point of view of the user. We know that the Rotterdam police can benefit from delivering a public service using VMC. We will investigate if in the eyes of users receiving that public service through the latest generation of VMC technology is acceptable.

Not all VMC systems are capable of transmitting audio and video signals in realistic, full-duplex mode so that nonverbal cues like head pose, eye-contact, and natural gaze can be perceived

(O'Connaill et al., 1993; Doherty-Sneddon et al., 1997), nonetheless, each technological advance increases the array of applications and the amount of use. The time when VMC was something tested in the laboratory is long past. The level of familiarity with VMC today makes it possible to study it in real-life.

Virtual crime reporting through VMC

The state-of-the-art system facilitating interaction between police officers in one location and the participants in our study in another is better compared to television than to conventional webcam and teleconferencing systems. Bouncing the projected image of the officer off a reflective panel angle-mounted in front of the filer enhances depth and allows for eye contact, an important part of non-verbal information-gathering and gauging how involved one's counterpart is (Argyle & Dean, 1965). That, Chroma keying, real-time video enhancement, and the latest codecs for video signal compression and decompression combined come closer to creating the "being there" feeling than ever before. Illustrations of conventional- and virtual crime reporting are provided in Figure 5.2.

Figure 5.2 Conventional- and virtual crime reporting.

4. METHODOLOGY

We used a narrative approach for our empirical study, because it allows for the discovery of processes from the perspective of the citizens involved (Jovchelovitch & Bauer, 2000). In applying a narrative approach, we chose for a constant comparative approach, which we adopted from Dick (2002; 2007). This constant comparative approach is visualized in Figure 5.3. We proceeded as follows. Each interview was recorded for later full transcription. Between successive interviews we coded data and compared new data to the overall body of data as it grew. We also used memo writing as a tool for the development of our ideas about why and how members of the general public come to acceptance judgments about use of VMC in

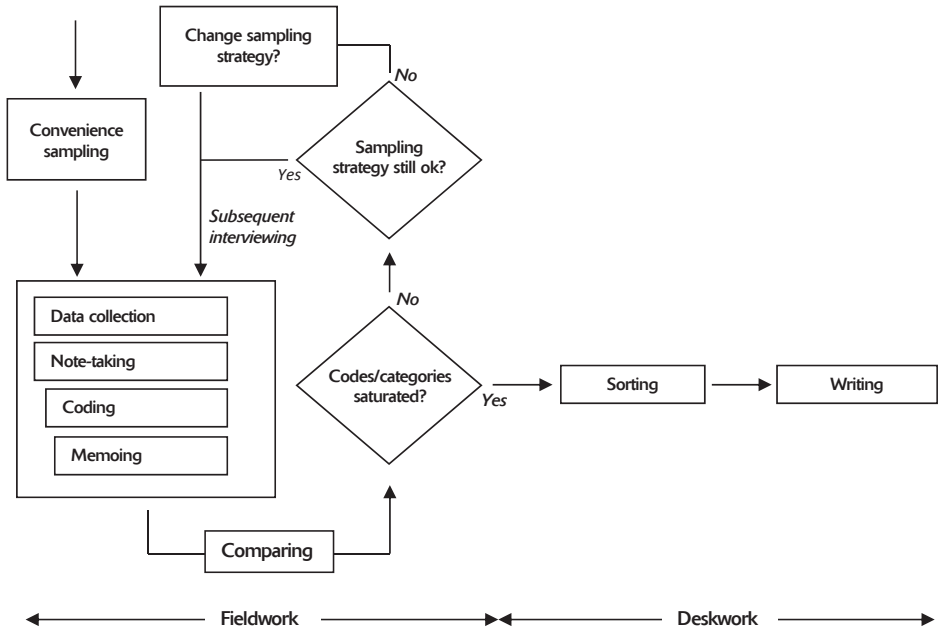


Figure 5.3 Visualization of this study's research process. Adapted from Dick (2007).

crime reporting (Lempert, 2007). After each interview we asked ourselves two questions: Are the codes we have constructed fully theoretically saturated, i.e. are no new properties being revealed by additional data? As long as the answer remained no, we went on collecting data, and posing a second question: Is the sampling strategy still adequate or should it be adapted? We continued on in that way until eventually we found no new processes explaining acceptance of virtuality. The moment of *theoretical saturation* was reached with the 36th interview. This implies that no new properties or dimensions emerged after coding this case and comparing these insights with the other cases; it did not lead to new theoretical insights in our research memos (Glaser, 2001). At that point we moved into the next phase of the research process, which entailed the sorting of the codes using atlas.ti qualitative data-analysis software and the writing of a report.

To achieve empirical variation and richness we wanted to select participants as randomly as possible – given the context. As our theoretical understanding increased our sampling became more purposive to fulfill our theoretical needs as will be explained below. We adopted a narrative-interview strategy such as proposed by Jovchelovitch and Bauer (2000), meaning that we began contacts by prompting participants to describe their VMC experiences in their own words. We set aside our semi-open topic list during the narrative phase, concentrating rather

on what the participants themselves had to say. We remained open to whatever questions or cues spontaneously emerged, but saved until the second phase direct questioning our initial coding framework based on UTAUT factors at first, and later on using the anchoring and adjusting processes, as we describe next.

We used UTAUT's central predictors as the a priori coding frame (Appendix 5.1). Our motivation to use UTAUT is mainly formed because it comprises today's landmark technology acceptance model (see a previous section) and therefore can be regarded as a powerful summary of received technology acceptance insights. Additionally, through the technique of peer debriefing among the authors of this study we discovered that the citizen's unfamiliarity, both with the type of technology and the unconventional application the technology in the context of reporting a crime to be a key pattern in the stories the citizens told us. The elderly couple we introduced in the introduction section is a telling example of this pattern of unfamiliarity. As a theoretical frame of reference, the processes of anchoring and adjusting are especially tuned to explaining attitudinal responses in situations where individuals have no specific previous knowledge on which to rely, such as the citizen's high unfamiliarity with the technology and its application as we observed in the interview data. We therefore decided to use the recent insights form empirical, process oriented anchoring and adjusting research in our subsequent research process (Mussweiler 2003). The theory section of this paper already discussed an empirically validated general process model and the definitions of both concepts.

We gathered data over a two-month period, October and November 2009. Thirty-six interviews were conducted, each of which immediately followed the filing of a police report using a state-of-the-art VMC system. All of the persons who agreed to participate in our study had come to the police station where the interviews were conducted with the intention of filing a police report. They were simply told that police reports of the kind they intended to file were taken using a new system and briefly what that entailed before being directed to the door of the room in which the VMC system was housed. It was left to the *virtual police officer* to explain the setting, to put filers at ease, and to establish a rapport with them, all of which usually took just a few exchanges between the police officer and the filer, then the taking of the report commenced. Filers could see the head and torso of the police officer, i.e. what they would normally see of the officer were the officer seated at a desk as is the conventional way of taking a report. Only once the crime report had been completed was the possibility of participating in the study brought up. Just two potential participants declined, in both cases because of a previously scheduled appointment.

5. RESEARCH RESULTS

We started this study to investigate why and how individuals make technology acceptance judgments. In this section we describe what this study revealed about participants' anchoring and adjusting and how that impacted their initial acceptance judgments.

Anchoring: a general assessment of technology–standard similarity

After conducting several interviews, we noticed distinct trends emerging in what participants said about their process of assessing VMC (i.e. the technology) in relation to salient features of face-to-face communication (i.e. an individual's standard) (Mussweiler, 2003). In relating their general beliefs about the use of virtual technologies (VMC) some participants spoke exclusively about its utility, while others added thoughts, even admonitions, about suitable use. We later labeled the range of responses *narrative scoping*. In the narratives, we also saw reflected a difference in respondent's initial attitude towards the technology, which manifested as being either curious or cautious, and labeled this pattern as *initial openness to experience (VMC)*. The clarity of these distinctions within the narratives allowed us to isolate three different anchoring viewpoints. We illustrate them in Figure 5.4. Below we discuss these viewpoints in detail and explain how they determine, and so are the keys to understanding, the making of initial acceptance judgments.

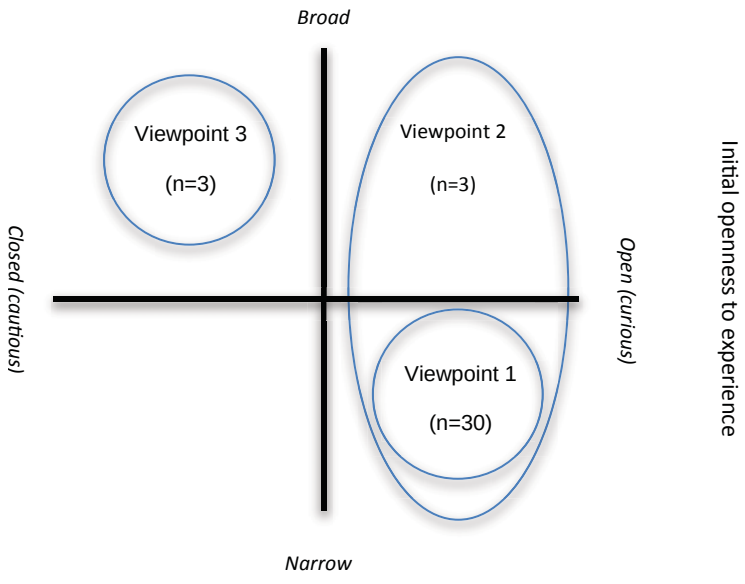


Figure 5.4 Anchoring viewpoints.

Anchoring dimension 1: Narrative scoping

We recognized two narrative scoping strategies: one narrow and the other broad. We mean by this that the participants either evaluated the technology solely on its own merits, or saw it in a wider social context, hence, the broad narrative scope not only takes in the merits of the technology, but also the context as well as the interrelationship between the technology and the context. In the case of our study, the wider social context is the reporting of a crime. The excerpts below, taken from two different interviews, are examples of narrative scoping, the first narrow, and the second broad. Examples of other excerpts are provided in Table 5.3.

> Interviewee (narrative scoping): *"The quality of the screen is good, it feels as if you are talking to a real person, you can actually see the expression's on the officer's face… You could say I am quite positive."*
>
> Co-Interviewee (broad scoping): *"I was saying to her [referring to a second woman who experienced the same episode and was filing a report at the same time] if something really terrible has happened to you, like a rape or molestation or if you killed a child in an automobile accident, then I would not recommend this way of communicating what happened to the police. These are different circumstances than what we experienced. In those other cases the technology would feel too distant… Oh, and the police officer should always be a human being and not some holograph with preprogrammed phrases like 'how dreadful for you, miss..' … you know, there should always be a [real] man or woman."*

By far the majority of participants, 30 out of 36, evaluated the technology on its merits alone, making no reference to the social context in which it was used; hence their narrative scope was narrow. The remaining six considered, in addition to the virtual technology itself, the social context in which it was used, that is, their narrative scope was broad.

Table 5.3 Anchoring dimension; narrative scoping

Narrow [Viewpoint 1 (n=30)]	Broad [Viewpoints 2 and 3 (n=6)]
"It [the technology] is lifelike, as if the police officer is actually in the room"	"You see in this case it is safer, for um, the police woman"
"One can almost touch her [the officer], I find it [mediating technology] really personal"	"This way of, crime reporting is much more efficient for both the police and myself"
"It [mediating technology] feels really human"	"I think this [technology] is applicable for many kinds of crimes one comes to report"

Anchoring dimensions 2: Initial openness to VMC

Another dimension along which participants differed was the way in which the participants expressed their openness to their (first) experience with VMC technology in the context of crime reporting. The participants showed two distinct patterns in their narratives; their first impressions could either be characterized as open (curious) or closed (cautious) towards VMC. There was not one instance of an in-between mode, thus we scored how they assessed the technology as one or the other. Some illustrative excerpts regarding openness towards VMC are provided in Table 5.4. Of the 33 curious participants open to experiencing VMC, many anchored the technology in terms of science-fiction, that is they positively related what they had experienced by borrowing images they could recall from films and television programs, most frequently the Matrix, CSI, Robocop, Judge Dredd and Minority Report. At the same time, many of these respondents also told to us that VMC and/or its application in public service provision was new to them and/or they also reported to be surprised to find this technology applied in the context of crime reporting. By contrast, three participants did not relate to the science-fiction genre, they did not find the VMC to be new, neither were they impressed by the technology, instead their initial anchoring could be regarded as being cautious, which they expressed by a distrust towards police and/or the governments agencies proper use of ICT as we will illustrate next.

Table 5.4 Anchoring dimension; openness to VMC [translated quotes, taken from interviews]

Open; curious/surprise [Viewpoint 1 and 2 (n=33)]	Not open; cautious/not surprised [Viewpoint 3 (n=3)]
"I found it a bit scifi, very cool! I am sorry, I am just being honest with you"	"You see, government and technology makes for a bad marriage, too many things can go wrong …"
"It's like, let's say a bit of CSI" (laughter)	"You see this [technology] is not new"
"It's like one of those American movies becoming reality, honestly"	"The world is full of technology, like email and webcams, all technologies enabling crossing barriers both in crossing time and space, and I am not surprised about this video-conferencing tool, nope. Nothing new really."
"I just had this feeling, wow I am in The Matrix [the movie]!"	

The three citizens, making up Viewpoint 3 brought up *trust* (as a level) during the narrative phase. Two of the three spoke about lack of trust in the Police, one saying, "those boys with the blue caps, nobody holds them in high regard, they chase after innocent people in sneaky ways instead of catching thieves". Two expressed little faith in the way that information and communication technology (ICT) would be used, one putting it: "You see, government and technology makes for a bad marriage, too many things can go wrong …" These specific ways of

expressing a general belief, in other words, anchoring with or without trust, or with or without a reference to trust, determined whether or not participants adjusted, and consequentially, the way in which they reached their initial acceptance judgments.

We summarize by returning to Table 5.3. The participant we described in the first pages of this paper typifies those holding Viewpoint 1. She was curious about the technology, spoke about its novelty, and made a quick/general evaluation and on its obvious merits, like the vividness with which the other is conveyed is (often surprisingly) similar to having face-to-face contact, notwithstanding the fact that many respondents felt also overwhelmed at first (see Table 5.4: respondents use of science-fiction genre to make sense of the situation, and explicit talk about being surprised). Thirty of the 36 participants shared this same combined narrow-open anchoring (i.e. comparing VMC with face to face communication on salient features), which evoked a positive search for further similarities between face-to-face communication (standard) and video-mediated communication (target). All participants represented in Viewpoint 1 were silent, not narrating about, trust or a synonymous construct as a salient feature (for them) for general comparison between target and standard.

There were six participants who took a broad view in their narratives; these participants also foresaw circumstances in which use of the technology might not be appropriate. Of those six, three participants were also open towards the technology, i.e. Viewpoint 2, and their general assessments (their anchoring) could be characterized as a general positive search for similarities between face-to-face communications, like the participants holding Viewpoint 1.

The three cautious participants, comprising Viewpoint 3 expressed their caution using trust, or actually a lack of trust, on which to base their first general assessments, on which the majority did not narrate at all. Their general distrusting beliefs about the police and government's use of ICT (anchors) made them differentiate/dissociate from video-mediated crime reporting (target) because it did not meet their general beliefs about how police and in general government should act (standards). Hence their first impression with VMC, evoked a closed attitude towards VMC because the general comparison between target and standard resulted in a (big) difference (Mussweiler, 2003); which manifested as caution and none-surprise in the narratives of these respondents (Table 5.4). Although, for most respondents trust was not regarded a salient (explicit and readily available in the narrative) feature for the general comparison of respondents holding Viewpoints 1 and 2, it turned-out to be a defining anchor for subsequent adjusting (Mussweiler, 2003), as we explain next.

Adjusting and non-adjusting processes: processes of selective VMC assessment

Participants related their first impressions and how they handled the situation. Again there were two mutually exclusive paths: adjusting or non-adjusting. An overwhelming majority, 33 of the participants (Viewpoints 1 and 2), adjusted, the remaining three (Viewpoint 3) did not.

Adjusting: similarity testing

We return to the couple reporting the burglary. She was fascinated by the technology – what she saw and that they themselves could be seen – and he related how quickly on the heels of their surprise they became used to the situation. Their adjustments were typical of those who anchored their experience like participants holding Viewpoints 1 and 2. One after another told us about "suddenly" getting used to it and that communication using it was "soon" just normal. In other words, they fully accepted VMC as a way to mediate contact between them and the police officer, and moreover their adjustment to communicating in that way came about with a quick shift in attitude. This is not to say that their acceptance was instantaneous. Some told us that it took a little back and forth between themselves and the police officer; that they needed to feel that they had made contact. Illustrative cases of Viewpoints 1 and 2 confirming this pattern are summarized in Table 5.5. It was clear that there was an intermediate process step during which there was conversational turn-taking, and the exchange of non-verbal cues like the establishing of eye contact to ensure a satisfactory level of communication (Doherty-Sneddon et al., 1997). The adjustment narratives voiced by the participants taking this route, consisted solely of cues that provide proof that the crime reporting through video-mediated communication (target) is just like face-to-face communication (standard) (Table 5.5), which following Mussweiler (2003), resembles a pattern of similarity testing through a selective search for standard consistent information. As a consequence, three dichotomies emerged naturally from our data. We label them personal-impersonal, warm-cold and human-inhuman. We illustrate these in Table 5.7. The 33 participants whom were open to the technology (Viewpoints 1 and 2) and unanimously adjusted their first impressions to a view that VMC is regarded 'normal' for reporting a crime, subsequently evaluated the system as personal, warm and/or human, with which they assimilate the qualities of VMC with face-to-face communication (Mussweiler, 2003). This contrasts sharply the citizens' views that were not open to this technology as we illustrate in the next paragraph.

Non-Adjusting: dissimilarity testing

The reactions we described above, although shared by the vast majority of participants, were not universal. We saw an alternative process of non-adjusting in the three cases holding Viewpoint 3. Those participants told us that they were "not at all impressed" by the technology and each

Table 5.5 Participant's adjusting strategies towards use of VMC in crime filing [translated quotes, taken from interviews]

Participant	Selective similarity assessments		
	Immediately impressed	Takes some time to get used to it	Normal way to communicate
A	"People who come across this, first think 'wow' what is this?"	"It takes some time to get used to … because it was the first time…"	"… but eventually it was just like a normal police officer sitting in front of you."
B	Interviewee: "I thought, What is this?" Co-interviewee: "indeed, strange!"	Interviewee: "It takes some time to get used to it, but five years from now this will just be the normal situation …" Co-interviewee: "… I got used to it pretty fast."	Interviewee: "All of a sudden, it (VMC) is not obvious anymore. From then on it was just a normal conversation." Co-interviewee: "Right."
C	"You are not going to believe what I just encountered!"	"Right from the beginning I was approached by the police officer in a very good way, and that gave me a jump start."	"In the end, the contact with the police officer is just normal"
D	"At first I was thinking, What is this? How does it work?"	"At first glance it is kind of strange, but you get used to it."	"… and when I was in that room a bit longer I got the feeling we were sitting across from each other."

of them also added that they found it to be "impersonal". Illustrative cases of Viewpoint 3 in which this pattern can be seen are outlined in Table 5.6. In all three cases the anchor, or general belief, of distrust was so strong, that it overshadowed how the specific technology was evaluated. These three none-adjustment narratives solely consisted of cues that provided proof to an implicitly held hypothesis that the crime reporting through video-mediated communication is not like face-to-face communication (Table 5.6). Following general anchoring theory, this pattern resembles a pattern of *dissimilarity testing*, through a selective search for standard-inconsistent information (Mussweiler, 2003). We discuss in the next section the way in which negative evaluations impact how acceptance judgments are formed.

Subsequently, and by contrast to Viewpoints 1 and 2, these respondents evaluated VMC as impersonal, cold and/or inhuman. This pattern resembles a high degree of contrast between the qualities of VMC and face-to-face communication (Mussweiler, 2003).

We found no indication in any of the current technology acceptance models (see Table 5.2) of evaluation of technology in terms of personification, i.e. descriptions of the technology in terms such as warmth or humanness, as illustrated in Table 5.7. We performed a literature search

Table 5.6 Participant's non-adjusting strategies towards use of VMC in crime filing [translated quotes, taken from interviews]

	Selective dissimilarity assessments	
Participant	Not impressed	No normal way to communicate
E	"I am not impressed by that display, because such technology will come eventually …"	"The conversation is just, what has been said, … it is less personal. It's like talking to a monitor and not to a real person. And I regret that …"
F	"I was not really surprised. The world is simply full of technology… you see, e-mail, webcams, videoconferencing are all remote communication available for consumers, so I am not surprised about this, no."	"This way of communicating is just a bit more impersonal. You can't talk to anyone face-to-face anymore."
G	"I personally think it sucks."	"I am negative about it [VMC], in most situations. I prefer talking to a real person rather than using this way [VMC]."

Table 5.7 Assessments of technology through assimilation and contrast [translated quotes, taken from interviews]

System's qualities	Assimilation (Positive)	Contrast (Negative)
Personal-impersonal	"One is able to establish real contact, very well! I Find it really personal."	"That screen makes it impersonal. It's impersonal, which I regret very much."
Warm-cold	"It felt like a warm bath."	"My impression is it's colder. I find the contact colder."
Human-inhuman	"I didn't get the impression that I was talking to a computer or a TV screen. I felt it was very human."	"It's all about screens nowadays … man is so often put in second place."

using keywords descriptive of the dichotomies found in our own data: personal-impersonal, warm-cold, and human-inhuman, and in doing so we found a seamless match with the *social presence*, a perceptive measure, first defined by Short et al. (1976). According to Short et al. (1976:65), social presence encompasses the perceived quality of the communications medium in terms of "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships." In other words, social presence is one party's sense of awareness of the presence of an interacting partner through a medium. That awareness is important for the way one comes to perceive and then form an opinion about others, that is, about their characteristics, qualities and inner state (Short et al., 1976). Based on this, we place the three dichotomies we described in one overall category: social presence. We elaborate on the impact of this finding in the discussion section.

Attitude towards virtual service provision: assimilation or contrast

Unsurprisingly, none of the participants made explicit reference to any technology acceptance model or theory. They expressed their reactions to the provision of a service virtually by using emic qualifiers such as good/bad, OK/not OK, good way/bad way, good idea/bad idea, positive/negative, no problem/problematic, and terms like fine, beautiful and cool. Although the use of abstract, etical language was absent, one can readily infer that when participants used words like "cool" to describe the technology they had adopted it (innovation diffusion theory), and as set out in the technology acceptance literature, accepted it to the degree that they intended to use it (Rogers, 1983; Rogers, Moore, & Benbasat, 1991). Again allowing for the use of emic rather than etic qualifiers, we found that without exception, those whose initial anchoring triggered similarity search (Viewpoints 1 and 2) and adjustment, perceiving it as personal, warm and/or human, were positive overall about using it themselves. Their selective search for similarity leads them to assimilate VMC (target) with face-to-face communication (standard) (Mussweiler, 2003). The three participants (Viewpoint 3) whose initial anchoring triggered a search for difference, subsequent non-adjustment, and eventual evaluation of VMC as impersonal, cold and/or inhuman, were critical of use of the technology overall. Their selective search for difference thus leads them to contrast VMC (target) with face-to-face communication (standard) (Mussweiler, 2003).

Putting it together: two selective processes leading to technology acceptance judgments

Our main research question was: what processes influence citizens' acceptance of a public service in a virtual way? Putting the different results of our analyses together we can define two paths, which are visualized in Figure 5.5. Participants took one of two paths – one leading to acceptance of the use of VMC in the delivery of a public service, i.e. assimilating VMC with face-to-face communication, the other leading to its rejection, i.e. contrasting VMC with face-to-face communication.

Path 1: selectively assimilating the technology with the standard, leading to acceptance

Most of the participants, 33 of the 36, were open towards VMC (Viewpoints 1 and 2). The participants following this path, all made a quick/general evaluation on VMC's obvious merits, by relating the similarities with face-to-face communication ("*it [the technology] is lifelike, as if the police officer is standing in the room*"). Notwithstanding the fact that many respondents

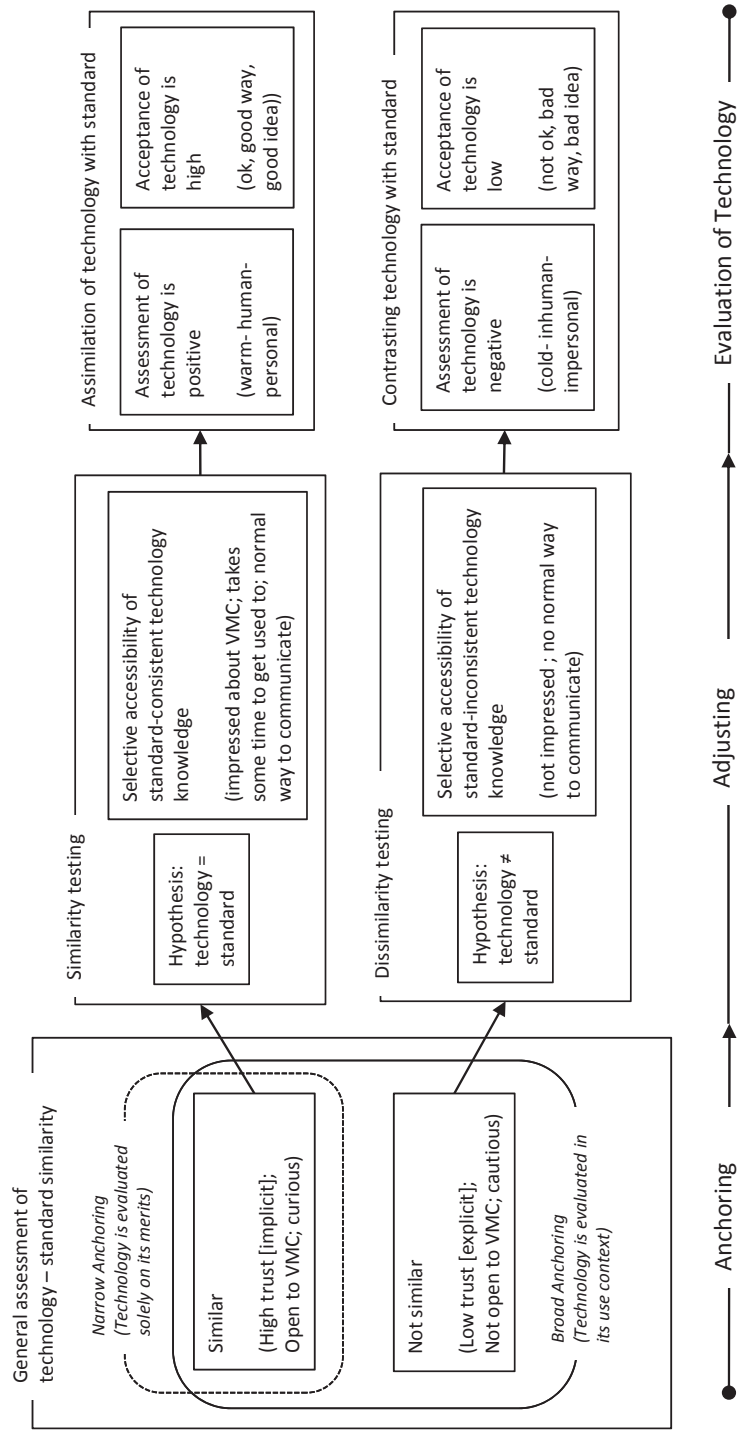


Figure 5.5 How anchoring and adjusting lead to technology acceptance of VMC.

felt also overwhelmed at first; they often expressed their curiosity and positive surprise by relating VMC to science fiction, using imagery from that genre in their narrations (Tables 5.3 and 5.4). Theses initial comparisons between VMC and face-to-face communication evoked a search for further similarities between face-to-face communication (standard) and video-mediated communication (target). After this first and quick general assessment, respondents following this path adjusted their initial anchoring. Adjusting took form as a selective search process of directed at finding (more) standard-consistent knowledge that verifies their implicit assumption that VMC is just like face-to-face communication. This selective process took place because individuals evaluate (their implicitly held) hypotheses by trying to confirm them (Klayman & Ha, 1987). We illustrate in Table 5.3 a three-part process of adjusting shared by them all, which can be regarded as a process of similarity testing. At first the participants were surprised to find themselves in such an unusual position, one so far removed from their daily lives. They needed a little time to establish eye contact and exchange a few words with the police officer, an intermediate step serving as a check of the level of nonverbal communication possible through the medium. Once this was done to the satisfaction of the participant, in short once the participant had become used to the situation, communication via the system was regarded normal, that end-state of adjusting process. Their adjusting, i.e. their selective search for similarity culminated in their final evaluations with which they fully assimilate VMC (target) with face-to-face communication (standard) (Mussweiler, 2003). Meaning that the participants following path 1 (Viewpoints 1 and 2) described the technology in terms like warm, personal and/or human, (high level of social presence) like face-to-face communication. In addition, the acceptance of the technology is also high because it has met the participants' basic communication needs (Doherty-Sneddon et al., 1997).

Path 2: selectively contrasting the technology with standard, leading to non-acceptance

The three participants base their first general assessments, on trust (Viewpoint 3), or actually on a lack of institutional trust (Peters et al., 2007). Their general distrusting beliefs about the police and government's use of ICT (anchors) made them differentiate/dissociate from video-mediated crime reporting (target) because it did not meet their general beliefs about how police and in general government should act (standards). Hence, their first impression with VMC evoked a closed/negative attitude towards VMC because the general comparison between target and standard resulted in a (big) difference (Mussweiler, 2003); which manifested as caution and none-surprise in the narratives of these respondents (Table 5.4). Their subsequent adjusting strategy was actually a process of non-adjusting because they wanted to affirm the difference between VMC (target) and face-to-face communication (standard), through selective dissimilarity testing (Table 5.6). Similar to the participants following path 1, this selective

process took place because individuals evaluate (their implicitly held) hypotheses by trying to confirm them. So this second path can be regarded the symmetrical opposite of path 1. In their narratives, the participants told us not to be impressed by this technology and VMC was regarded not a normal way to communicate (Table 5.6). The subsequent evaluation of VMC took form as a process of contrasting the essential features (social presence dimensions) of face-to-face communication with VMC. Symmetrically opposing participants following path 1, they described the technology itself as cold, impersonal and/or inhuman, i.e. there was low social presence (Table 5.7). Subsequently, VMC was rejected and acceptance of the technology was low.

Thus, we found that the *necessary condition* for a participant to either accept or reject the use of VMC, in the reporting of a crime is that participant's general belief concerning: *trust in the police* and/or *trust in government agencies to properly use ICT*. None of the participants who accept VMC in the reporting of a (Path 1) mention trust at all, and those who are explicit about trust always express a lack of trust, they do not adjust their general belief, and they make low acceptance judgments (Path 2). As shown earlier (see Table 5.2), most conventional technology acceptance models stress cognitive predictors. However, all of participants in our study used affective dimensions of the social presence construct to value VMC's perceived qualities. This is an interesting finding with important implications for future technology acceptance research.

6. DISCUSSION

This study set out to increase our understanding of what processes influence a citizen to accept a public service when it is brought to him/her in a virtual way. We studied this topic in the context of crime reporting mediated by a video signal. The application of anchoring and adjusting as coding concepts, rooted in decision-making literature (Tversky & Kahneman, 1974; Mussweiler, 2003), revealed two micro processes (Figure 5.5) in the context of technology acceptance. In this section we discuss how these micro-processes complement current technology acceptance research (see Table 5.2/Appendix 5.1). Firstly, we found that whether or not an individual accepts VMC lays in the general belief structures of that individual. This observation became apparent in this study in the way participants anchored their first experiences with VMC and how this anchoring subsequently determined a citizen's technology acceptance judgment (see Tables 5.3-5.7). This finding complements the most widely accepted variance models (see Table 5.2), which focus on specific beliefs held about the technologies under study. Also, all but one of UTAUT's theoretical mechanisms (Appendix 5.1) emphasizes the influence of an end-user's *specific* assessment about a given technology. The only UTAUT exception to this pattern is the theoretical mechanism describing how experience influences technology

acceptance, because this theoretical mechanism describes how a more *general* experience might influence a specific technology acceptance judgment. Instead, we found in our study two general beliefs to be a *necessary condition* for acceptance of VMC: *trust in the police* and *trust in government agencies to properly use ICT*. Both general beliefs inhibited the respondents (to open-up for the technology) and explore the similarities between target and standard, instead dissimilarities were sought (and found) which in the end lead to a rejection of the technology (Tables 5.3-5.7). While Wixom and Todd (2005) proposed a technology acceptance model in which beliefs are further divided into object based beliefs (about system and information quality) and behavioral based beliefs (about ease of use and usefulness), their categorizations still emphasize the importance of an end-user's specific beliefs about a specific technology. We believe that future technology acceptance research should look in equal measure at specific beliefs and general beliefs. The local and contextual distinctions such as the general beliefs of *trust in the police* and *trust in government agencies to properly use ICT* we uncovered can be a starting point. However, the distinction made by Ajzen (1991) between: behavioral, normative, and control beliefs can provide a more general and theoretical frame of reference to study the impact of general beliefs on technology acceptance. One could also integrate part of neo-institutional theory with technology acceptance models. Especially the cultural-cognitive pillar of institutions could prove to be fruitful (Scott, 2001). We find the processes of anchoring and adjusting to be applicable beyond our context, especially in public service settings that are highly institutionalized such as hospitals, banks, and a wide range of government agencies. Additionally, with the coming of age of artificial social actors, we think this process model of technology acceptance can also help understand our acceptance of artificial social actors in (public) service provision.

Secondly, we found an individual's judgment to accept VMC in crime reporting to be mainly influenced by affective processes. This finding complements current technology acceptance literature (Table 5.2), which predominantly relies on cognitive predictors. Also in UTAUT's theoretical mechanisms (Appendix 5.1) we found that all but one theoretical mechanism is cognitive in nature. The only affective process in UTAUT is the theoretical mechanism describing the influence of anxiety felt with the focal technology. Instead, from the results of our study we observe that the affective qualifier *social presence* played an important role in explaining citizen acceptance of VMC in the filing of a police report, cognitive (UTAUT) qualifiers were not identified. This finding complements the overwhelming stress in most variance models of technology acceptance on cognitive predictors and brings us to this study's third contribution.

Thirdly, the social presence construct turned out to be positively related to technology acceptance. We therefore argue that social presence might be added as a predictor to UTAUT.

This result calls for further variance model testing of the importance of the social presence construct as a predictor of acceptance of virtual technologies. Following Short et al. (1976), we propose that this construct may have significant explanatory value when the technology is used to mediate human interaction, for example in video-conferencing, face-to-face video calling, rich-chat environments, Skype™ communication, etc. (Short et al., 1976; Doherty-Sneddon et al., 1997). Likewise, we think that future research could investigate whether the processes that emerged in this study are found in other contexts in which virtual mediating technologies are used to facilitate interaction between humans, and indeed even between humans and non-human actors. Other researchers might also look at the delivery of human service by any number of local government agencies, or by healthcare professionals. The combined discoveries of both anchoring & adjusting and the social presence construct may increase our understanding of technology acceptance and not only regarding VMC Researchers looking at contexts in which human interaction is mediated by technology.

Limitations

The combination of this specific technology and the small sample used in this study might raise some concerns, for example about the robustness of the findings. We are, however, quite sure that the patterns we found provide a robust view of the similarity (n=33) and dissimilarity (n=3) paths, because of the marginal added value additional interviews added to our theoretical understanding, which was recorded in our research memo's. That is, for both paths theoretical saturation was fully reached after 36 interviews. Moreover, we are convinced that the actual proportion of non-adjusting citizens, relative to adjusting citizens is also quite similar to what we observed in the sample. That is roughly every 10th participant in our sample was a non-adjusting citizen, whereas there were 3 non-adjusting citizens out of 36 in the sample. Despite these considerations, the sample used is rather small, which might imply that our findings might be not representative for the entire population. However a much more representative source of empirical evidence supporting this claim comes from counting the relative proportion of non-accepting citizens from the chapter 3 UTAUT study (n=224), because non-adjusting lead one-on-one to non-acceptance. In this study, the amount of citizens providing negative evaluations on the study's dependent variable 'intention to use virtual crime reporting' is 15%. This statistic is quite similar to the 10% non-adjusting citizens reported in this chapter's narrative approach.

The timeliness of the study however is not in question. The kind of cutting-edge technology our participants encountered may very well be the answer to balancing the desire to deliver the best possible service and the reality of budgetary constraints. Making the most of it is crucial.

We therefore look forward to future research directed at validating this study's findings with other technologies and in other settings. One such area for future exploration and extension is exploring additional types of anchors/anchoring that cause an end-user of technology to selectively search for similarity or difference and hence accept (assimilate) or reject (contrast) a technology. Related to this topic is research directed at studying the relationship between respondents' personality structure and the general beliefs they hold. In our case it may well be that the general beliefs about distrust, which cause rejection of the technology, are rooted in one's personality structure, like for example differences in one or more of the 'big five' in personality factors: openness (to experience), conscientiousness, extraversion, agreeableness, and neuroticism (John et al., 2008).

Recommendations for implementation of virtual technologies in (public) organizations

Our findings are equally relevant in terms of practice. We have two recommendations: First, practitioners using virtual technologies in human service settings should consider the ways in which the technology can convey and transmit emotions such as warmth, sociability and humanness (i.e. social presence). Over 90 percent of our participants indicated that they relied exclusively on these factors in forming their judgment to accept the technology.

Second, we advise that the training of those who will be delivering services through virtual technologies emphasize the importance of the moment of first contact with the virtual technology in light of the fact that attitudes about the technology are swiftly formed, and that anchoring plays a pivotal role in attitude formation. Establishing eye contact and providing a warm welcome, i.e. maximizing the impact of social influence on acceptance, are crucial in creating the feeling that the technology is a valid way of mediating human contacts and emotions, that is, in maximizing the impact of social presence on acceptance.

Endnotes

1 Lee (2004) provides a thorough overview of the conceptual and empirical definitions and measures of virtuality.

2 In the section entitled 'virtual crime reporting' we provide information on the cost savings of the Rotterdam Police.

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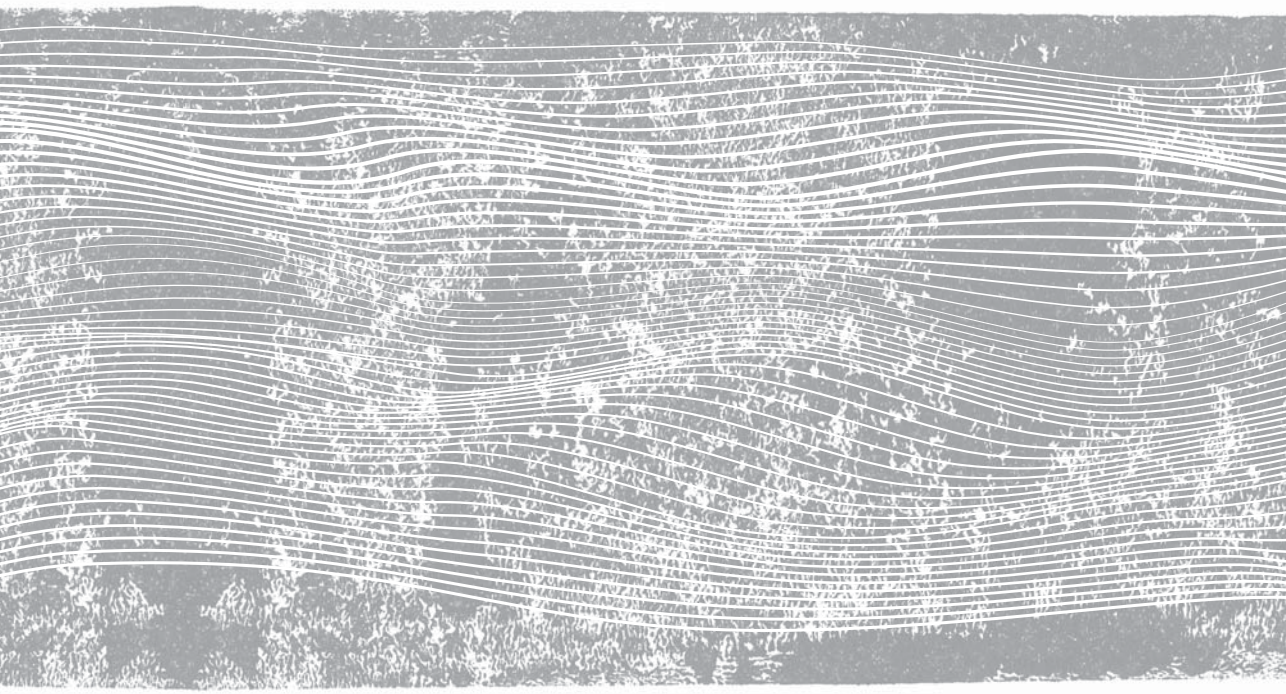
Appendix 5.1 UTAUT's theoretical mechanisms

Independent variable	Direction	Theoretical mechanism
1. Effort expectations	+	Similar to the ease of use construct in Technology Acceptance Model (Davis et al., 1989), there are two theoretical mechanisms by which effort expectations influence intentions, attitude and behavior: self-efficacy and instrumentality. Self efficacy: the easier the system is to interact with, the greater should be the user's sense of self-efficacy regarding his or her ability to carry out the sequences of behavior needed to operate the system (Bandura & Cervone, 1986; Davis et al., 1989: 987). Instrumentality: the effort saved due to improved usefulness, may be redeployed, enabling the person to accomplish more work for the same effort (Davis et al., 1989:987). The positive effect between ease of use and (intention to) use seems to diminish over extended and sustained usage (Venkatesh et al., 2003:450).
2. Performance expectations	+	Perception of enhanced job performance is instrumental for achieving rewards that are extrinsic to the work itself, such as: pay increase and promotions (Vroom, 1964; Davis et al., 1989). Similar to the usefulness construct in the technology acceptance model, i.e.; the degree to which a technology is perceived as useful, to enhance job performance, positively relates to the acceptance of that technology.
3. Social influence	+	Social influence has an impact on (intention to) use through three mechanisms: compliance, internalization, and identification (Warshaw, 1980; Venkatesh & Davis, 2000). The latter two relate to altering an individual's belief structure and/or causing an individual to respond to potential social status gains, the compliance mechanism causes an individual to comply with the social influence. Individuals are more likely to comply with others' expectations when those others have the ability to reward desired behavior and punish undesirable behavior (French & Raven, 1959; Warshaw, 1980).
4. Experience with related technology	+	More experienced users of technology accept new technologies easier then less experienced users of technology (Davis et al., 1989).
5. Facilitating conditions	+	Behavior, such as using a technology, cannot occur if objective conditions in the environment prevent it (Triandis, 1977). Objective conditions out there, in the environment, can be identified if a group of observers agree that a given factor can make an act easy to do. In UTAUT those factors are referred to as facilitating conditions. Facilitating conditions includes aspects of the technological and/or organizational environment that are designed to remove (that is positively influence) barriers to use, such as the facilitating conditions in the model for PC utilization (Thompson et al., 1991) and compatibility in innovation diffusion theory (Rogers, 1983).
6. Anxiety with medium (computer anxiety)	-	Torkzadeh and Angulo (1992) suggested that computer use avoidance could be viewed from three perspectives of computer anxiety: psychological, sociological, and operational. The psychological perspective focuses on fear of damaging the computer system and computer files. The sociological perspective focuses on fear related to changes of social pattern, job demands and the insecure job status due to computerization. The operational perspective is caused by operational problems when performing computer-related tasks. All three cause computer use avoidance. Anxiety with computers is, therefore, a kind of state anxiety, which can be changed and measured along multiple dimensions (Gilroy & Desai, 1986; Igbaria & Chakrabarti, 1990).

Chapter 6

Persuasion effects of subjectivistic- and objectivistic arguments in strategic decision-making: a field experiment about an IT implementation decision[1]



[1] A modified version of this chapter is submitted for publication in European Journal of Information Systems by Hoefnagel, Oerlemans, Goedee and Curseu.

ABSTRACT

To understand how strategic decision makers respond to different types of arguments, in actual decision-making, we replicate and extend the elaboration likelihood model of persuasion in a field experiment. We use a mixed within-between subjects design with two populations, one made up of 20 strategic decision makers, assumed high in domain specific cognitive complexity, and the other of 64 masters students, deemed low in such cognitive complexity. Predicting a direct effect of strong or weak argument quality on change in decision maker implementation intention, we explored the moderating effect of both objective and subjective argument meta-framing, of source credibility, and of decision maker domain specific cognitive complexity. We found general support for a positive and direct effect of argument quality on intention. We also found that effect to be positively moderated by objectivistic meta-framing when decision makers perceived the information source as credible. Decision makers low in cognitive complexity responded more strongly to both strong and weak arguments than did decision makers high in cognitive complexity.

1. INTRODUCTION

Organizations often rely heavily on information technology to perform tasks efficiently, making IT implementation decisions of core strategic importance to them. While implementation decision making has been extensively studied, and has yielded a wealth of insights about the antecedents and outcomes on an organizational- and industry level of analysis (Narayanan et al., 2011), yet little attention has been paid on the level of the individual, that is how strategic decision makers respond to informational inputs about IT implementation. This has left an important area of SDM largely unexplored (Basel & Bruhl, 2013). As with any decision-making, implementation decision-making requires decision makers to integrate different types of evidence from different qualitative sources. Toulmin (1958) proposed that persuasive argumentation is made up of a number of essential components including claim, ground, and warrant, i.e. a supposition, support for it, and a statement bridging the two. Despite being central to decision making, there is still much that we do not know about the way in which qualitatively different arguments are processed by strategic decision-makers. The most widely-accepted model is the elaboration likelihood model of persuasion (ELM) (Petty & Cacioppo, 1979; Petty & Cacioppo, 1981). The ELM addresses how different types of arguments most effectively predict and explain the decisions of consumers, patients, and citizens at large (Hoeken & Hustinx, 2009). Unsurprisingly, the literature on SDM suggests that application of the ELM holds promise for increasing understanding of the persuasive workings of arguments, and yet, research on the extent to which ELM is used remains somewhat scarce (Basel & Bruhl, 2013). We seek with our study to increase understanding of SDM

cognition by replicating and extending the ELM in the context of an actual ICT implementation decision.

First, we extend the model by empirically exploring whether statistic-based or narrative-based evidence is more persuasive, an area of ELM research that has yielded inconclusive results to date (O'Keefe, 2003; Hoeken & Hustinx, 2009). We argue that the on-going debate about which ground, as it is referred to in the Toulmin Model Argument, or which evidence type, the term used in the ELM literature, is most persuasive could be advanced by shifting the analytical focus away from ground or evidence type to the meta-framing of argument structures themselves (Toulmin, 1958; Hoeken & Hustinx, 2009). We mean by the meta-framing of an argument the assumptions about human nature and the ontological, epistemological, and methodological positions which taken together enable and constrain the argument logic, what Toulmin (1958) calls its claim, ground, and warrant. Including the meta-framing of arguments in our analysis allows us to extend the ELM beyond its almost exclusive focus on argument quality. We therefore pose the following research question: What type of argument meta-framing is most persuasive for strategic decision makers? We distinguish between objectivistic and subjectivistic meta-framing, the former calling on statistical evidence, and the latter on narrative. We attempt to test the moderating effect of an argument's meta-frame by observing the relationship between argument quality and a change in intention on the part of the recipient. More exactly, is there a change in implementation intention?

Our second extension of the ELM has to do with the moderating effect of decision maker domain specific cognitive complexity (DSCC). The ELM sees cognitive complexity as a necessary condition in that otherwise the individual would be unable to process the diverse elements of persuasive communication (Iederan et al., 2009), and indeed cognitively complex individuals tend to perform better in making decisions related to tasks of average to high complexity than do cognitively simple decision makers (Streufert & Swezey, 1986). Complex and interpretative cognitive representations about a decision to be made are both differentiated and integrated conceptual structures of decision-related information (Iederan, Curseu, & Vermeulen, 2009). To come to a decision requires the integration of multiple arguments, we believe that DSCC is an important contingency. To test this we ran an experiment in which master students at a Dutch university, assumed to be low in DSCC, and strategic decision makers within the Dutch police force, high in DSCC, took part. Our experiment was of mixed design that allowed us to study the impact of argument meta-framing on both populations. It also allowed us to address the ecological validity of working with a sample made up of students to describe and explain strategic decision making behaviour, a topic which has received considerable attention in strategic cognition research (Basel & Bruhl, 2013). Lastly, we replicate the moderating effect of source credibility, and so lend support to a key variable in prior ELM studies (Ajzen, 2005; Fishbein & Ajzen, 2010).

Our study contributes to understanding ICT implementation decisions in four important ways. One, we answer calls for more research applying the ELM to strategic decision making and to strategic cognition (Basel & Bruhl, 2013). Two, we test a theoretically-grounded way of looking at whether statistical or narrative evidence is more persuasive for strategic decision makers (Hoeken & Hustinx, 2009). To the best of our knowledge we are among the first to do so. Three, we address the ecological validity of strategic cognition research in which students make up a sample population by incorporating cognitive complexity as a moderator (Basel & Bruhl, 2013). Four, we inform practitioners, and also academics active in evaluation research and policy research, on how to effectively influence strategic decision makers.

In the next section, we briefly introduce the elaboration likelihood model, provide a thorough accounting of the unresolved debate surrounding the relative impact of statistical-based vs. narrative-based arguments, and then define the variables of interest and theorize on their impact. We then present our methodology and report on our results. In the conclusion we discuss their implications.

2. THEORY

Since Petty and Cacioppo (1979) introduced their elaboration likelihood model of persuasion some 35 years ago, it has evolved to become one of the most influential theories of persuasion (Choi & Salmon, 2003). Relatively recently Bohner, Erb and Siebler (2008:162) framed a new definition for persuasion: "[T]he formation or change of attitudes through information processing in response to a message about the attitude object." The ELM maps out two paths to persuasion, a central route and a peripheral one, which are defined by the extremes of a processing-effort continuum (Petty & Cacioppo, 1986). In the case of the former it is the strength of message content, i.e. the argument quality, that drives information processing, and in the latter it is cues, such as the credibility or attractiveness of the source or the number of arguments (Petty et al., 2004). To process information centrally an individual must both be motivated and have cognitive ability (Petty & Cacioppo, 1986). Indeed, peripheral processing often prevails, as individuals cannot elaborate extensively on every message they receive. Nonetheless, the ELM literature suggests that a change in attitude induced through the central route tends to be more persuasive and to persist longer than a change prompted through the peripheral one (Petty et al. 2004). While the two routes are antithetical in their persuasive outcomes, central processing and peripheral processing can occur simultaneously (Petty & Cacioppo, 1996; Crano & Prislin, 2008). *Multiple roles* is an important ELM postulate, which states that a variable can play more than one role. Depending on the amount of initial elaboration, a variable can serve as an argument (high elaboration), a peripheral cue (low elaboration), or a

factor affecting the amount or direction of elaboration (middle range elaboration) (Crano & Prislin, 2008).

2.1 What evidence type is most persuasive?

Although largely unaddressed in the strategic decision making literature, researchers who study what makes some arguments more persuasive than others have long attempted to determine whether statistic-backed or narrative-backed arguments are more effective (McCroskey, 1969; Chaiken, 1980; Boster & Mongeau, 1984; Petty & Cacioppo, 1986; Stiff, 1986; O'Keefe, 1990). The elaboration likelihood model has been used, primarily in field experiments, as the theoretical basis for the operationalization and testing of a variety of message-related variables (Massi Lindsey & Yun, 2003). There is still considerable debate among researchers about whether statistical or narrative evidence is more persuasive. Many empirical studies provide meta-analytical evidence that indicates that statistic-backed arguments are more powerful (Baesler & Burgoon, 1994; Chaiken & Maheswaran, 1994; Ah Yun & Massi, 2000; Hoeken, 2001; Reynolds & Reynolds, 2002; Slater & Rouner, 2002; Greene & Brinn, 2003; Hornikx, 2005; Hoeken & Hustinx, 2006; Hornikx, 2007; Hornikx, 2008). The results of other studies lend support to the contention that narrative-backed arguments are the stronger of the two types (Kahneman & Tversky, 1972; Kahneman & Tversky, 1973; Nisbett & Borgida, 1975; Nisbett & Ross, 1980; Dickson, 1982; Taylor & Thompson, 1982; Sherer & Rogers, 1984; Reinard, 1988; Kazoleas, 1993; Brosius, 2000; Morgan et al., 2002; Stitt & Nabi, 2005). Still other studies report that neither has a clear advantage over the other (Nadler, 1983; Iyengar & Kinder, 1987; Baesler, 1997; Cox & Cox, 2001; Hoeken, 2001). Finally, while few in number and as of yet inconclusive, there are more recent studies that indicate that a combination of statistical and narrative evidence could carry more weight with decision makers than either type individually (Allen et al., 2000; Hornikx & Houët, 2009; Good, 2010).

There are several explanations for why the statistics vs. narrative debate continues, chief among them being that which type of argument is most persuasive depends on the message, the source, the recipient, and the context, and that each of these can have complex effects that increase persuasion in some situations and decrease it in others (Petty et al., 2004). Clearly, more empirical work is needed to determine under what circumstances the most persuasive argument will be statistic-based, narrative-based, or a combination of the two. In addition, in the literature on message persuasiveness it is often the case that the type of evidence and the structure of the argument are left undefined. Our contribution to resolving the debate consists in shifting the object of analysis from the ground component of the argument, that is the evidence type, to the meta-frame of the argument in which evidence is encapsulated (Toulmin 1958, O'Keefe 2003).

2.2 Defining key concepts

In this section we define our dependent variable, *change in implementation intention*, and independent variables, *argument quality*, *argument meta-frame*, and *cognitive complexity*. According to Petty and Cacioppo's (1979; 1986) ELM a persuasive message can be conceptualized through observation of change in one or more specific attitudinal categories, thus often studies using ELM have as the independent variable cognition, affection, or intention. Our dependent variable is *change in intention to implement*, which we define as a change in an individual's perceived probability of acting in a particular way, in the case of our study, the intention to implement video-mediated crime reporting (Fishbein & Ajzen, 2010:39). We see a positive change in intention to implement as indicative of the persuasive effect of a message. We adopt a term used in the persuasive communication literature, *boomerang effect*, to describe when a change in intention is contrary to the objective of the communicator.

In the elaboration literature it is generally agreed that argument quality is an important perceptual message factor and thus a crucial variable, if not the single most important one (Petty & Cacioppo, 1996). For the first of our three independent variables we adopt Petty and Cacioppo's (1986:32) definition of *argument quality* as being "[T]he nature of the message cognitions generated by the argument, thus not nature of the structure of the argument." They offer two important clarifications in writing that in the case of a strong argument "when subjects are instructed to think about them, the thoughts they generate are predominantly favourable" whereas with a weak argument "when subjects are instructed to think about them, the thoughts they generate are predominantly unfavourable" (Petty & Cacioppo, 1986:32). We draw on Burrell and Morgan's (1979) seminal work in defining our variable *argument meta-frame* as the ontological, epistemological, and human nature assumptions and the methodological approach that enable and constrain argument logic. Differences in assumptions and approach yield two distinctive meta-frames, an objectivistic one and a subjectivistic one, with specific claim, warrant and data (Toulmin, 1958).[2]

We begin with the Burrell and Morgan (1979:1) definition of ontology as "[A]ssumptions which concern the very essence of the phenomena under investigation." What is reality? Realism and nominalism are ways to describe the world, to negotiate within it, indeed to make sense of it. Realism holds that there is a real world and it is made of hard, tangible and relatively-fixed structures which exist independently of man. In contrast to this, the external world of nominalism is made up of nothing more than names, concepts and labels, which are used to construct reality. To frame it in negative terms, nominalism does not refer to 'real' structures in the world.

2 Of course, other distinctions are theoretically possible, as we put forward in the discussion section.

For Burrell and Morgan (1979:1), epistemology consists in "[A]ssumptions about the grounds of knowledge – about how one might begin to understand the world and communicate this as knowledge to fellow human beings." Their scheme shows what they term "the grounds of knowledge" on a continuum. Positivism is at one extreme, relativism and the related concept of constructivism at the other. Positivism seeks "to explain and predict what happens in the social world by searching for regularities and causal relationships between... elements" (Burrell & Morgan, 1979:5). Positivists would say that the results of their research represent reality, constructivists that the social world "can only be understood from the point of view of the individuals who are directly involved in [it]" (Burrell & Morgan, 1979:5). Constructivists aim not to represent reality but to re-present it, and the reality they re-present is that perceived by individuals (Alvesson & Deetz, 2000).

Human nature, as Burrell and Morgan (1979:6) define it, is "[T]he relationship between human beings and their environment." While closely related to ontology and epistemology, human nature is nonetheless a separate concept according to which individuals shape, or are shaped by, the environment. In qualitative research, these respective ends of the continuum are termed determinism and voluntarism. Finally, according to Burrell and Morgan (1979) ontological, epistemological and human nature assumptions hold direct implications for the methodological nature of inquiry in that they influence how one investigates the world and how knowledge can be obtained from it (Burrell & Morgan, 1979). Burrell and Morgan distinguish between a nomothetic and ideographic methodological position. The nomothetic position is characterized by the use of a systematic protocol and a largely quantitative technique for the analysis of data, usually collected through standardized surveys, questionnaires, tests and experiments. The result is fact-like knowledge. An ideographic approach stresses the importance of understanding a subjective account, of getting inside everyday situations that are part and parcel of the on-going flow of life. As researchers seek an impressionistic account, data collection is done primarily using methods with which they can tap into narratives. Diaries, biographies and open interviews can be rich ideographic data sources. From those four dimensions we can construct two extreme positions, located at the ends of the four. As we show in Figure 6.1, the opposing ends of the ontological, epistemological, human nature, and methodological continua can define the objectivistic and subjectivistic approaches to social science.

The paradigms laid out in Figure 6.1 serve as the two meta-frame categories of this study. Here we elaborate further on the objectivistic and subjectivistic meta-frames. With an objectivistic meta-frame, fact-like knowledge is used and arguments can be seen as a representation, a mirror image of reality. Indeed, the argument itself, as well as the social phenomena reported upon in the argument it reflects, are real, tangible, regardless of whether the phenomena are material,

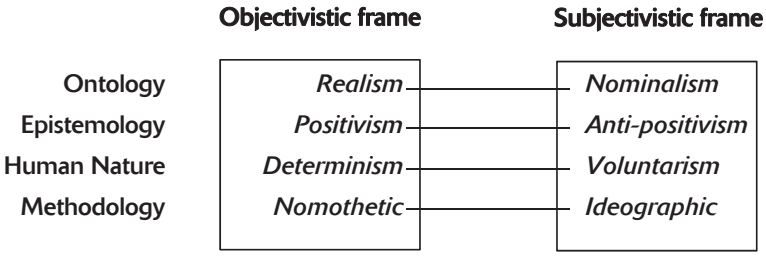


Figure 6.1 Positioning of objectivistic and subjectivistic meta-framing.

Table 6.1 Assumptions grounding an objectivistic argument meta-frame in the context of strategic decision-making

Paradigmatic dimension	Assumption	Implications for argument construction
Ontology	Realist	The message represents real, tangible phenomena. It is a mirror image of it.
Epistemology	Objectivistic	Explicit knowledge about a subject or an object can be acquired directly, by searching for regularities and causal relationships between constructs (= nomen) representing reality. Messages contain directly transferable, explicit, universal, objectivist knowledge.
Human nature	Deterministic	A message aids in predicting and explaining human behaviour.
Methodology	Nomothetic	The methods of inquiry are meant to uncover relationships between constructs (= nomen).

mental or spiritual. The point of inquiry is to uncover reality and report upon it, through the search of regularities between nomen, also known as constructs or variables. We summarize the objectivistic assumptions and their implications for argument construction in Table 6.1.

A subjectivistic meta-frame is based on the assumption that knowledge is impressionistic. Unlike in the case of an objectivistic meta-frame, which communicates fact-like knowledge, a subjectivistic meta-frame can best be understood as a collage that provides a rich image of the discursive features of a phenomenon. The argument is itself a construction, as well as a means of disseminating the constructions of others. The subjectivistic assumptions and implications for argument construction are summarized in Table 6.2.

Table 6.2 Assumptions grounding a subjectivistic argument meta-frame in the context of strategic decision-making

Paradigmatic dimension	Assumption	Implications for argument construction
Ontology	Nominalistic	The message is re-presented as an impressionistic intra-subjective account about a phenomenon. What results is a collage of its features; no claim is made of absolute truth.
Epistemology	Anti-positivistic	Individual constructions about a phenomenon can be uncovered by digging into the frame of reference of an individual. The message, a construction, provides the starting point for understanding knowledge that cannot be transferred directly, i.e. implicit knowledge, and also for the non-universal, or relativistic, knowledge of individuals.
Human nature	Voluntaristic	Messages that help decision makers understand the uniqueness of individuals.
Methodology	Ideographic	Methods are meant to tap into individual accounts in a way that allows for 'getting inside' situations that are part of the everyday flow of life.

Iederan et al. (2009:73) define cognitive complexity as "[T]he ability to differentiate alternative perspectives and to integrate these perspectives into an informed decision." In the ELM, motivation and cognitive complexity are seen as necessary conditions for the processing of information, without which there can be no persuasive communication. Cognitive complexity is a dual-facetted concept in that it is both an attribute of a cognitive system and domain specific. By an attribute of a cognitive system we mean that a cognitively complex individual can take into account many aspects of environmental information (high differentiation), discriminate between them (subtle articulation), and integrate them in ways that can generate alternative views and solutions (flexible integration) (Schröder et al., 1967; Iederan et al., 2009). Cognitive complexity is domain specific in that an individual may be highly complex as decision maker in some specific areas, topics, or contexts and less in others. For instance, a decision maker may be highly complex in finance and IT investments, but less so in HR.

2.3 Conceptual model

Direct effect

As we noted earlier, the ELM sees motivation and cognitive ability as the two major factors that determine whether an individual engages in central/systematic or peripheral/heuristic argument processing. Given that a decision maker's evaluation of argument quality requires both motivation and ability, the inference is that assessing argument quality is a central processing activity, i.e. high elaboration, rather than one that relies on peripheral/heuristic cues such as

source credibility, the number of arguments, and the like, i.e. low elaboration. We have also noted that central processing of argument quality is likely to result in longer-lasting attitudinal change (Petty & Cacioppo, 1979). Hence,

> *H1: Strong arguments have a more positive effect than weak ones on change in intention to implement.*

Moderating effects

Burrell and Morgan have argued that there are philosophical assumptions behind the different approaches social scientists take when ordering the world and reporting on it. We go one step further in proposing that the persuasive appeal of an argument might in part rely on that argument's 'meta-frame' by means of the social proof heuristic. Cialdini (1993:131-132) describes social proof as a heuristic by which "[We] view a behaviour as correct in a given situation to the degree to which we see others performing it. Whether the question is what to do with an empty popcorn box in a movie theatre, how fast to drive on a certain stretch of highway, or how to eat chicken in a restaurant, the actions of those around us will be important guides in defining the answer." Similar thinking has been applied to why statistical evidence is more persuasive than narrative, in that basically we see statistical evidence as proof of what others believe is correct (Massi Lindsey & Yun, 2003). In explaining the persuasiveness of an argument meta-frame, we follow the social proof heuristic and we provide other meta-theoretical argumentation for why certain arguments provide more convincing frames for social proof than others. As the assumption that social proof works as a heuristic, that is that there is peripheral processing, has yet to be empirically validated, we seek to find clear indication of how peripheral and central persuasion come about.

If indeed the social proof heuristic assumption is correct, we expect an objectivistic argument meta-frame to be more persuasive and thus to be more likely to bring about a change in intention, because the assumptions behind an objectivistic argument are specifically tuned to provide the evidence needed for solid social proof. In contrast to a subjectivistic argument meta-frame, an objectivistic one is more likely to provide a factual presentation of a certain social reality, that is that there will be high social proof. This is because objectivistic argument meta-frames have a realist ontology, they mirror reality, when the right procedure and technique, i.e. nomothetic methodology, are used, thus the knowledge claims are highly predictive for human behaviour according to a deterministic view of human nature.

To be able to empirically study whether the above reasoning works as a peripheral cue, i.e. heuristic, and if so to what extent, we consider simultaneously argument meta-frame and the long-standing direct effect of argument quality on intentional and attitude change. This leads

us to formulate a hypothesis regarding the impact of argument meta frame on the intentions of strategic decision makers.

> *H2: The positive effect of a strong argument is stronger for arguments with an objectivistic than a subjectivistic meta-frame.*

Schroder, Driver and Steufert (1967) write that individuals high in cognitive complexity will show less attitudinal change when presented with new additional information, and Ideran et al. (2009) that highly complex cognitive structures have the ability to take into account more situational aspects in processing information. Applying this to decision making, we deduce that when provided with strong arguments and weak arguments, decision makers low in cognitive complexity will change implementation intention more than decision makers high in cognitive complexity given that the latter have a greater ability to take into account more situational aspects in processing information (Schröder et al., 1967). This leads us to formulate the following hypothesis regarding the impact of cognitive complexity on strategic decision maker intention (see Figure 6.2).

> *H3: The positive effect of a strong argument is stronger for decision makers low in cognitive complexity than for decision makers high in cognitive complexity.*

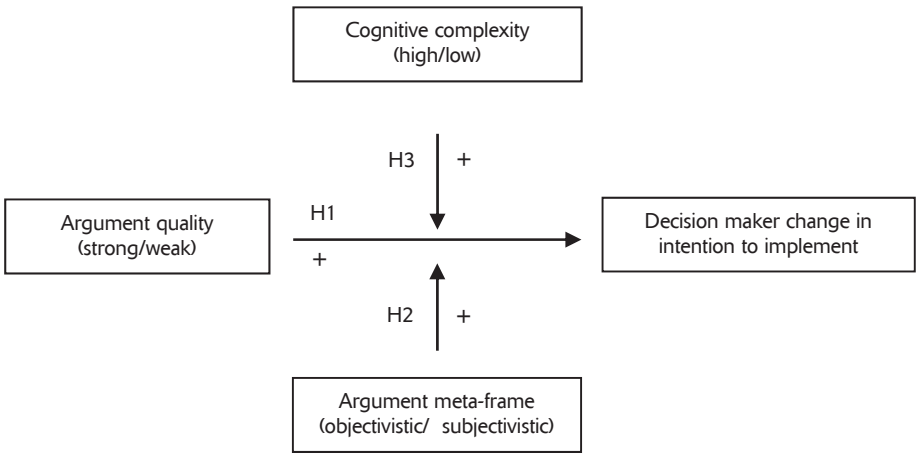


Figure 6.2 Conceptual model of the impact of argument meta-frame and cognitive complexity on strategic decision maker intention to implement.

3. METHODS

3.1 Design

We use a mixed model design with two within-subject factors, strong/weak argument quality and subjectivistic/objectivistic argument meta frame, and one between-subjects factor, high/low domain specific cognitive complexity. Our main dependent variable is change in implement intention. The model is shown in Table 6.3.

Table 6.3 The four manipulations

Domain specific cognitive complexity	Argument quality	Argument meta-frame	
		Objectivistic	Subjectivistic
Low (Master students)	High	Scenario A: objectivistic, high	Scenario B: subjectivistic, high
	Low	Scenario C: objectivistic, low	Scenario D: subjectivistic, low
High (Strategic decision makers)	High	Scenario A: objectivistic, high	Scenario B: subjectivistic, high
	Low	Scenario C: objectivistic, low	Scenario D: subjectivistic, low

The within-subject design maximizes power and controls for individual differences. To counter carry-over effect, a major disadvantage of within-subject designs, we apply the Latin-square technique for counterbalancing as follows. Following Latin-square logic, we identify four different paths that a respondent might follow through the four manipulations of our study. We illustrate that in Table 6.4. The first respondent is provided with the 4 manipulations as described in the sequence of path 1 (ABCD) and so on.

Table 6.4 Latin-square counterbalancing strategy (the letters refer to the four scenarios of manipulation from Table 6.3)

Path	Sequence			
1	A	B	C	D
2	B	C	D	A
3	C	D	A	B
4	D	A	B	C

To test the hypotheses on *cognitive complexity* (Hypotheses 3) we modelled cognitive complexity as a between-subject factor. We maximized the domain specific aspect of cognitive complexity while controlling as much as possible for the cognitive aspect of cognitive complexity. We were able to maximize the domain specific aspect of cognitive complexity, by first defining a domain specific experiment task and then relating our group selection procedure to that task's domain specificities. We wrote a vignette in which the experiment task was summarized. We asked respondents to read it, consider the task, and then make an ICT investment decision for the Dutch police force based on the domain specific information given in the vignette. This allowed us to distinguish between two groups, which were different from one another in terms of their domain specific cognitive complexity: one made up of Dutch police force strategic decision makers, high in domain-specific cognitive complexity, and the other of master students in organisation studies at a Dutch university, low in domain-specific cognitive complexity. We took the police force decision makers to be high in domain specific cognitive complexity given their decision-making and operational experience in policing. The masters students on the other hand we took to be low in domain specific cognitive complexity for the decision making task they were asked to perform given that their domain specific cognitive map is far less elaborate in comparison to that of the policing decision makers, while training in the master organisation studies prepares them as potential strategic decision makers. The masters students were the baseline group against which we compared the domain specific aspect of cognitive complexity in that the cognitive capabilities of masters students and police force decision makers are roughly similar, the students having nearly achieved an advanced degree whereas the police force decision makers would have already done so at some point in their careers as this is one of the requirements for promotion to a level in the force where one is called upon to make strategic decisions.

3.2 Measurements

We chose variables which have proven influential in previous studies of persuasion (Fishbein & Ajzen, 2010). For most we used scales already validated in the literature. In addition to measuring change in implementation intention we subtracted the pre-test values of the variables from their post-test values. (For the items comprising this scale see Table 6.5.) We included *credibility of the information source* and *age* and *sex* as control variables. We discuss in the following section the operationalizations for the four manipulations, combining argument meta-frame and argument quality.

Table 6.5 Variables, definitions and measurements

Variable	Definition	Indicators of measurements
Argument quality (ARQU)	The nature of the message cognitions generated by the argument, thus not the nature of the structure of the argument (Hirschheim et al., 1996:32)	Indicator of strong arguments: "[T]he argument is such that when subjects are instructed to think about it, the thoughts they generate are predominantly favourable." Indicator of weak arguments: "[T]he argument is such that when subjects are instructed to think about it, the thoughts they generate are predominantly unfavourable." (Hirschheim et al., 1996:32) [Manipulation: further measurement, see section 3.2]
Argument meta-frame (ARME)	The ontological, epistemological, human nature and methodological positions enabling and constraining argument logic. (Burrell & Morgan, 1979)	[Manipulation: further measurement, see section 3.2]
Cognitive complexity (CC)	The ability to differentiate between alternative perspectives and to integrate them to make an informed decision (lederan et al., 2009:71)	High cognitive complexity, i.e. high domain specific cognitive maps: Strategic decision makers with the Dutch police force Low cognitive complexity, i.e. low domain specific cognitive maps: masters students at a Dutch university [Between subjects measure]
Change in intention to implement (INIM)	A change in estimation of the likelihood or perceived probability of performing a given behaviour, in the case of this study, to implement VMC)] (Fishbein & Ajzen, 2010:39)	Pre-test values were subtracted from post-test values of INIM to calculate change in INIM. INIM is composed of 4 items (4 statements): I intend to engage in VMC implementation in my police force I expect to engage in VMC implementation in my police force I plan to engage in VMC implementation in my police force I will engage in VMC implementation in my police force (Fishbein & Ajzen, 2010) (Both pre-test and post-test measure/ 7-point Likert scale)
Covariates/control variables		
Source credibility (SOCR)	Overall believability of the source (Chia, 1994:62)	The source is credible (Post-test measure/ 7-point Likert scale)
Age (AGE)	The age of the respondent	What is your age? (Post-study measure / years)
Gender (GEN)	The gender of the respondent	What is your gender? (Post-study measure /male-female)

Note: Post-test measurements followed every manipulation, post-study ones after the experiment was concluded

3.3 Development of manipulations

To measure argument meta-frame we performed five steps, which we diagram in Figure 6.3. First, we used Burrell and Morgan's (1979) scheme to build a framework to define, and distinguish between two mutually exclusive subjectivistic and objectivistic meta-frame categories. Second, we took Toulmin's (1958) claim, warrant and ground components of a practical argument as an analytical framework to distinguish between three generally applicable argument components irrespective of the metaphysical positions taken. Third, we combined the results from these first two steps to form a definition of the mutually exclusive properties of an objectivistic and subjectivistic argument meta-frame. This enabled us to construct empirical examples, real and artificial (Table 6.6).

Table 6.6 Argument meta-frame operationalization framework

Argument component	Meta-frame dimension	Objectivistic argument meta-frame	Subjectivistic argument meta-frame
Claim	Human-nature	The claim is factual in nature, it helps decision makers in prediction and control [Deterministic human-nature]	Constructions of (attitudinal) patterns, helping decision makers understand the unique positions of individuals [Voluntaristic human-nature]
Warrant	Ontology & Epistemology	Authorization between ground and claim through a universally applicable procedure [Positivistic epistemology]	Authorization between ground and claim through a display of the variety of subjective accounts [Nominalist ontology]
		Which ensures the ground truly represents, i.e. mirrors reality [Realist ontology]	The researcher himself explains the audience that the display is a resultant of his increased understanding which is temporarily saturated [Anti-positivistic epistemology]
Ground	Methodology	To study nomen and their relationships between and across contexts typically large-scale, statistical data in a universal format and thus easily transferable/ comparable is used [Nomothetic methodology]	Data which allows decision makers to get inside situations is used, typically it is small scale, narrative data, in a local format which is not easily transferable/ comparable [Ideographic methodology]

The fourth step involved two parts. In the first, 4A, we used data that we obtained from empirical research to operationalize two strong objectivistic arguments and two strong subjectivistic ones. Prior to this study the authors studied citizen acceptance of video-mediated crime reporting in the city of Rotterdam (the Netherlands) in an objectivistic and a subjectivistic way. The

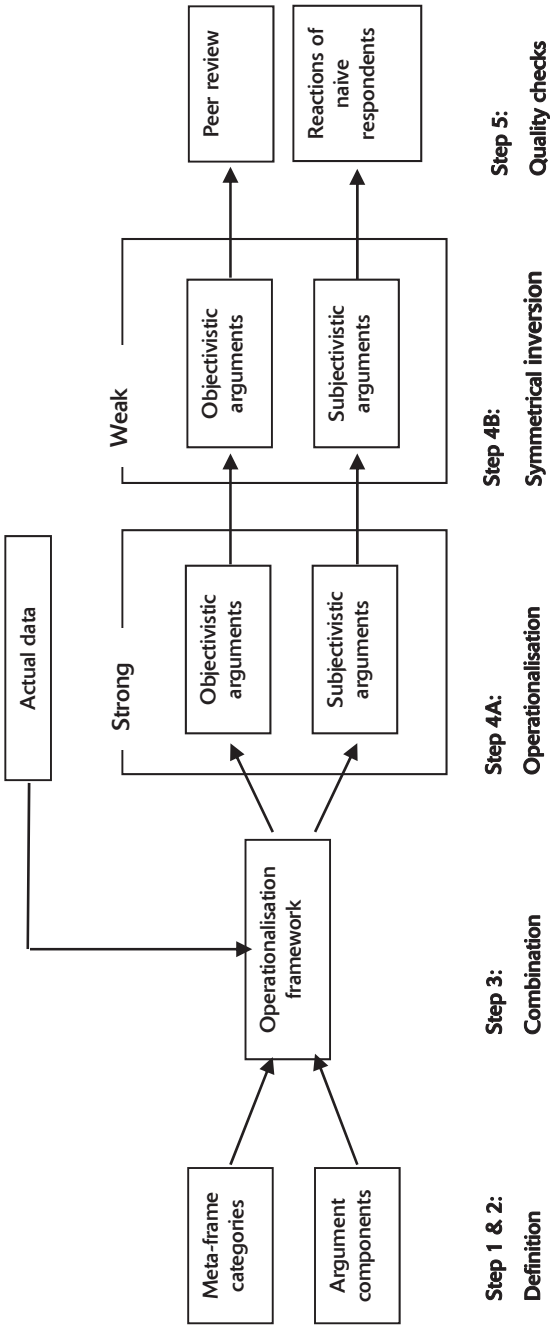


Figure 6.3 Operationalization process: steps and results.

results of these objectivistic- and subjectivistic studies, which have been published elsewhere in peer-reviewed journals (Hoefnagel et al., 2012; Hoefnagel et al., 2014), are used as inputs for this process.

The evaluations we obtained from both studies were already phrased in a typically strong form, for instance with claims such as: "*Most citizens accept video-mediated crime reporting*". We then used our operationalization framework to ensure that no essential element of either set of practical arguments was missing, such as the following ground belonging to the claim above: "*Seventy-three percent of the 224 citizens involved in the study were positive about video-mediated crime reporting, about 17% were negative, and the remaining 10% were neutral.*" Finally, we checked whether the language used was consistent with Burrell and Morgan's work and corrected the argument's claim, ground and warrant as needed. In 4B we used the technique of symmetrical inversion to construct weak arguments from those strong ones. This technique was first suggested and applied by Petty and Cacioppo (1996), and has been used many times since (Fishbein & Ajzen, 2010). In Appendix 6.1 the four manipulations resulting from this process can be found.

In addition to these four steps, we did checks of the quality of our work procedure and its outcomes. To check the quality of our manipulations we subjected our operationalization and its outcomes to peer review. In addition, we asked all of the respondents to rate each manipulation in terms of argument meta-framing (objectivistic/subjectivistic using a 7 point differential scale), and argument quality (high/low using a 7-point semantic differential scale). The results of the validity check for naïve respondents can be found in the results section.

3.4 Data collection

The master students received their manipulations in a classroom setting, and were asked to process the information they were given silently and alone. The strategic decision makers received questionnaires by mail after first being briefed in person about the research. Both groups received the same manipulations. The checks of the manipulations showed that they were of sufficient quality (see next section).

3.5 Sample

Our sample included 20 (a response-rate of 65%) strategic decision makers from the Dutch police force and 64 masters students at a Dutch university, 2012-2013. In Table 6.7 we give the age and gender distribution for each group.

Table 6.7 Sample statistics

		Strategic decision makers [with the Dutch police]	Masters students [at a Dutch university]	Total
Age (M / SD)		47 / 8	24 / 4	29 / 11
Gender	Male	15	40	55
	Female	5	24	29
Total		20	64	84

4. RESULTS

To check for adequate randomisation, we verified that the pre-test assessment of *intention to implement*, the measure needed to study the composite measure of change in intention to implement, differed significantly across the four Latin-square sequences. Using MANOVA we found no statistically significant difference across the four Latin-square sequences (F(1,80)=.31/ p=.82). We concluded from this that there was no bias in selection.

We checked the manipulations with post-test assessments, that is, we tested after each manipulation. We did so by asking each respondent to assess all four manipulations on a 7-point semantic differential scale ranging from objectivistic to subjectivistic. We found that respondents assessed the objectively framed arguments, both weak and strong, more objectively than they did the subjective strong and weak argument [F(1,80)=5.43 / p=.002, eta-squared = .21]. Moreover, the respondents recognized a difference between objective and subjective arguments to a large extent. We concluded that the manipulations were effective.

Source credibility is a key ELM variable (Fishbein & Ajzen, 2010). Factor analysis revealed that the individual post-test assessments of source credibility described a property of the respondents rather than of the manipulations. We arrived at this conclusion because we found that the individual post-test assessments (all single items) of source credibility were correlated and for two pairs the correlation levels exceeded 0.5 (Table 6.8). Further investigation, using factor analysis, revealed

Table 6.8 Correlation matrix of the four post-test assessments of source credibility

Post-test source credibility assessment	1.	2.	3.	4.
1. Objective - strong	1	.54	.35	.33
2. Objective - weak	.54	1	.34	.46
3. Subjective - strong	.35	.34	1	.50
4. Subjective - weak	.33	.46	.50	1

that the KMO index for this factor is high (KMO = .69) and Bartlett's test of sphericity is highly significant (chi-square = 77.1 / sig = .000).

We therefore assembled the individual post-test items regarding source credibility in a single composite measure, labelled *source credibility*, which turned out to form a scale of acceptable reliability (see the Alpha in Table 6.9). Taking the results of correlational and reliability analysis into account, we found clear indications that the individual items together reflect a unitary construct describing respondent tendency to trust the information presented in the experiment. Thus, we chose to use this new scale as a measure for source credibility in further analyses.

4.1 Reliability and correlation analysis

The results of the reliability and correlation analysis can be found in Table 6.9. The reliability of the scales used in this study range from acceptable to excellent and can therefore be used for further analyses.

Table 6.9 Reliability and correlation analysis (= sig <.01 * sig <.05)**

Scale	Alpha	Mean	SD	1.	2.	3.	4.	5.	6.
1. Intention to implement pre-test	.95	3.28	1.38	1	.56**	.39**	.38**	.27*	.34**
2. Intention to implement change strong-objective	.95	.56	1.07	.56**	1	.52**	.39**	.29**	.14
3. Intention to implement change strong-subjective	.90	.27	1.03	.39**	.52**	1	.39**	.29**	-.18
4. Intention to implement change weak-objective	.96	-.91	1.38	.38**	.39**	.43**	1	.75**	.01
5. Intention to implement change weak-subjective	.97	-.88	1.41	.27*	.29**	.31**	.75**	1	.02
6. Source credibility	.74	2.87	1.07	.34**	.14	-.18	.01	.02	1

4.2 Testing the hypotheses

Descriptive statistics for the dependent variable change in implementation intention are shown in Table 6.10, and MANOVA results in Table 6.11. Recall that in the ELM a change in intention to implement can be positive, a persuasive effect, or it can be negative, a boomerang effect, or even neutral, no effect.

Table 6.10 Descriptive statistics (DV = Change in intention to implement)

Manipulation	Experiment group [cognitive complexity]	M	SD	N
Strong – Objective arguments	Student [low]	.68	1.16	64
	Strategic decision maker [high]	.21	0.50	20
	Total	.57	1.08	84
Strong – Subjective arguments	Student [low]	.32	1.16	64
	Strategic decision maker [high]	.12	0.38	20
	Total	.28	1.03	84
Weak – Objective arguments	Student [low]	-1.06	1.49	64
	Strategic decision maker [high]	-.43	0.91	20
	Total	-.91	1.39	84
Weak – Subjective arguments	Student [low]	-.99	1.54	64
	Strategic decision maker [high]	-.53	.92	20
	Total	-.88	1.43	84

The MANOVA results fully support Hypothesis 1 [$F(1,80)=9.27$ ($p=.003$), $\eta^2=.11$ the observed power is $\pi=.51$], which states that strong arguments are more persuasive, i.e. they yield a stronger positive change in ICT implementation intention, than weak arguments.

This analysis also shows that weak arguments induce stronger boomerang effects, i.e. negative change in implementation intention ($M=-.89$ / $SD=1.31$), than strong arguments induce persuasive effects, i.e. positive change in implementation intention ($M=.41$ / $SD=0.92$). A paired t-test reveals the difference to be highly significant [$T(168)=2,78$ ($p=.006$)]. Initially, we found no support for Hypothesis 2 which states that the positive effect of strong arguments is stronger in the case of arguments with an objectivistic meta-frame than arguments with a subjectivistic meta-frame [$F(1,80)=2.88$ ($p=.09$), $\eta^2=.04$ the observed power is $\pi=.39$]. However, the impact on implementation intention of the interaction between argument quality and argument meta-frame is statistically significant when this moderation effect interacts with source credibility [see Table 6.11; $F(1,80)=4.59$ ($p=.035$), $\eta^2=.05$ the observed power is $\pi=.56$]. Recoding *source credibility* into a dummy variable (low, high) enables us to better interpret the three-way interaction (See Figures 6.4a and 6.4b). We can conclude in both cases that Hypothesis 2 is confirmed but only if a respondent perceives the source of an argument as highly credible. Therefore, only if the respondent values the source as highly credible (Figure 6.4a) are objectivistic-strong arguments more persuasive, i.e. they will lead to a positive change in the decision maker's implementation intention, than subjectivistic-strong arguments, and thus lead to a more positive change in

Table 6.11 MANOVA, DV: change in Intention to implement

	F (sig)	Partial Eta Squared	Observed Power
Within-Subject effect			
Argument quality	9.27* (.003)	.10	.85
Argument quality * Source credibility	.1 (.757)	.00	.06
Argument quality * Gender	.13 (.725)	.00	.06
Argument quality * cognitive complexity	8.38** (.005)	.10	.82
Argument metaframe	1.94 (.168)	.02	.28
Argument metaframe * Source credibility	3.84 (.053)	.05	.49
Argument metaframe * Gender	0.21 (.648)	.00	.07
Argument metaframe * Cognitive complexity	0.12 (.729)	.00	.06
Argument quality * argument metaframe	2.88 (.094)	.04	.39
Argument quality * argument metaframe * Source credibility	4.59* (.035)	.05	.56
Argument quality * argument metaframe * Gender	.61 (.438)	.00	.12
Argument quality * argument metaframe * Cognitive complexity	1.70 (.197)	.02	.25
Between subject effect			
Intercept	.53 (.468)	.01	.11
Source credibility	.02 (.891)	.00	.05
Gender	.98 (.324))	.01	.16
Cognitive complexity	.09 (.762)	.00	.06

*** = sig <.001, ** = sig <.01, * = sig <.05

implementation intention. The opposite can also be observed, but to a lesser degree (Figure 6.4a). If a respondent values the source as highly credible, then objectivistic-weak arguments lead to a slightly stronger boomerang effect, i.e. a negative change in a decision maker's implementation intention, than does a subjectivistic-weak argument.

Hypothesis 2 can thus only be confirmed when the information source is found to be highly credible by the decision maker. We reflect upon the implications of this finding in the discussion section. Source credibility, gender, and cognitive complexity had no significant direct effect on change in implementation intention (Table 6.11).

We found general support for Hypothesis 3, which states that the positive effect of strong arguments (H1), is stronger for decision makers low in cognitive complexity than for those high in cognitive complexity. The interaction between argument quality and cognitive complexity is statistically significant [$F(1,80)=8.38$ ($p=.005$), $\eta^2=.10$ the observed power is $\pi=.82$]. However, let us take a closer look at that 3-way interaction [argument quality*cognitive complexity seems to me to be a 2 way interaction]. We show in Figure 6.5 that strong arguments do indeed have a stronger positive effect on change in implementation intention for respondents *low* in domain specific cognitive complexity (the masters students) than for respondents *high* in

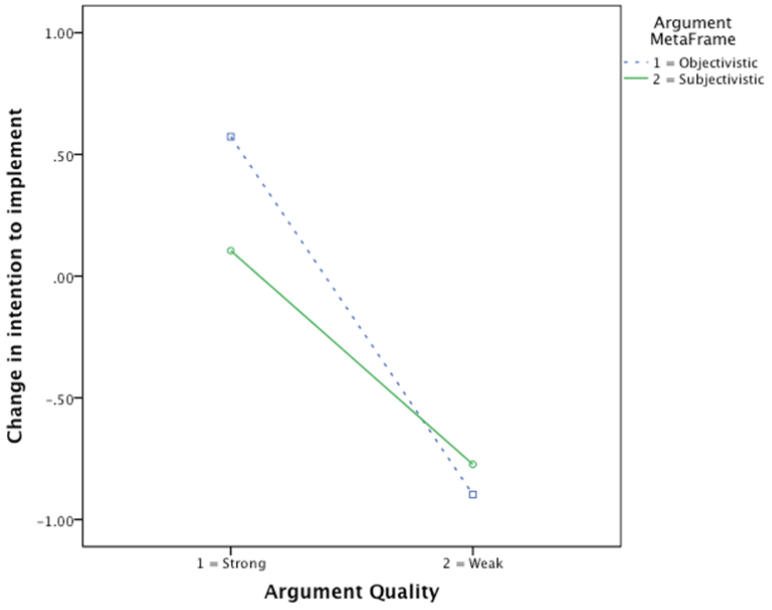


Figure 6.4A Change in Intention to Implement, dummy source credibillity = high.

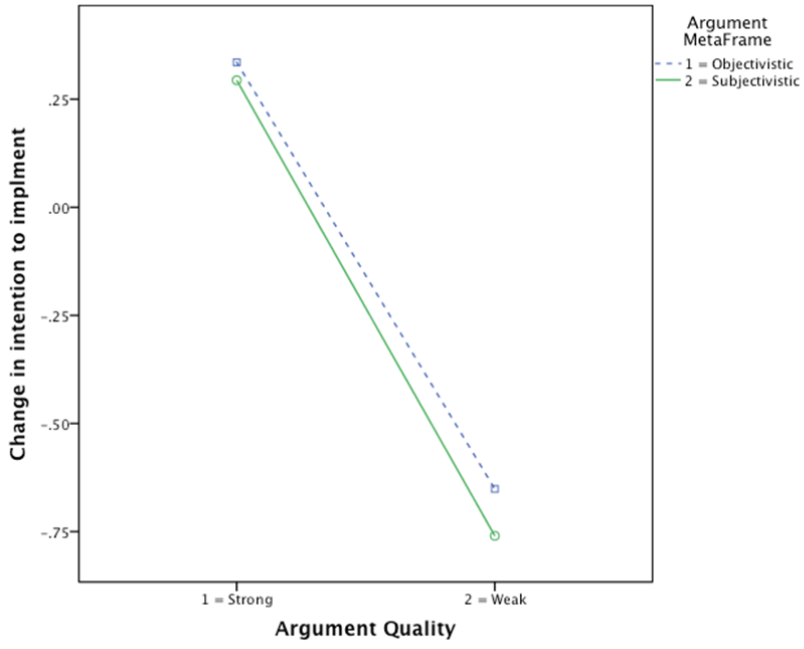
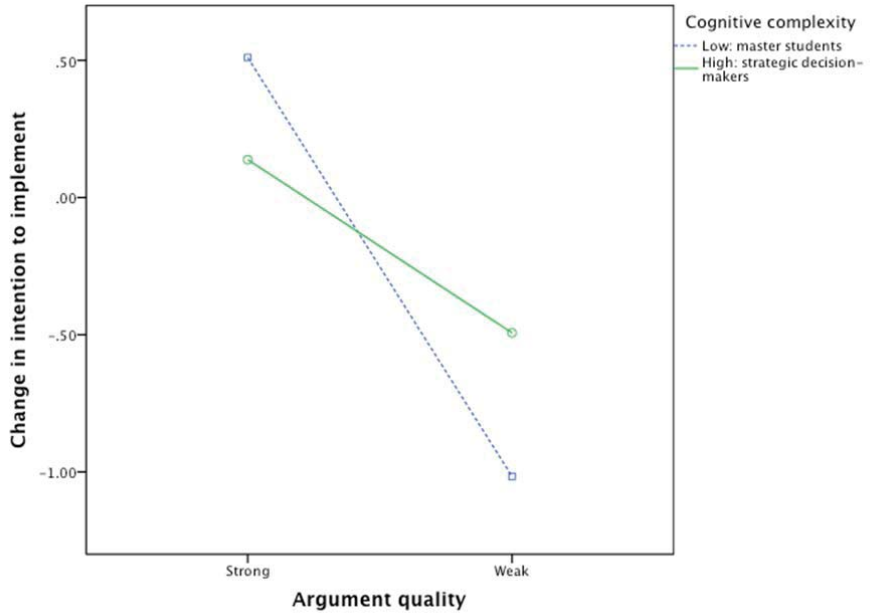


Figure 6.4B Change in Intention to Implement; Dummy source credibillity = low.

domain specific cognitive complexity (police force strategic decision makers). Moreover, when presented with strong arguments, the respondents high in domain specific cognitive complexity hardly changed their implementation intentions compared to the pre-test assessments. In addition, decision makers low in domain specific cognitive complexity have a larger overall range in change in implementation intention (Figure 6.5), compared to decision makers high in cognitive complexity. We conclude from Figure 6.5 that strategic decision makers have cognitive strategies for counter-acting the workings of the peripheral route to persuasion. Next, we summarize our findings and discuss their implications.



Covariates appearing in the model are evaluated at the following values: gender = .44, AVG SourceCred = 2.86

Figure 6.5 Change in intention to implement, argument quality * Decision maker cognitive complexity.

4.3 Summary of the findings

We replicated and extended the ELM in an experiment designed to assess intention to implement a new technology. We used two respondent groups, which differed in domain specific cognitive complexity (DSCC); one made up of Dutch police strategic decision makers (high DSCC) and the other of masters students at a Dutch university (low DSCC). We provided typical strong and weak arguments for the implementation decision and concluded that strong arguments are indeed more persuasive, that is that they have a positive and direct effect on

decision maker change in implementation intention. We also found the opposite relationship in that weak arguments have a boomerang effect, meaning that they have a negative direct effect on change in implementation intention. Moreover, we observed that the boomerang effect of weak arguments is much larger than the persuasive effect of strong ones.

We hypothesized that strong arguments are more persuasive when the arguments are presented in an objectivistic rather than subjectivistic argument framing. We could not directly confirm this hypothesis. However, we did find that the hypothesis is confirmed when the information source is considered to be highly credible by the decision maker. Thus, when source credibility is high, objectivistic meta-framing leads to higher change in implementation intention than subjectivistic meta-framing. This is the case for both strong arguments that have a persuasive effect and weak arguments that have a boomerang effect. As before, the boomerang effect induced by weak arguments is larger than the persuasive effect induced by strong arguments. Finally, we found that for both strong and weak arguments, decision makers with high DSCC are generally less likely to change their implementation intention than decision makers with low DSCC (Hypothesis 3).

5. DISCUSSION

There are three important implications of this study for both research and practice. First, we answered a key question about decisions to implement IT: Is statistical evidence or narrative evidence most persuasive for strategic decision makers? We conclude that strategic decision makers considering major ICT investments are persuaded more by objectivistic than by subjectivistic arguments, but only when the information source is considered to be highly credible. Thus this study can throw light on the unresolved debate in the persuasion literature over which evidence type is most persuasive, as it highlights the importance of argument meta-framing. However, no single study could settle such a general question. Actually, what we found is "it depends". Our study shows that which evidence type is most persuasive is contingent upon context, decision maker cognitive complexity and belief about the credibility of the source, and of course, argument quality. Thus, we conclude that the question of whether statistical or narrative evidence is more persuasive is too simplistic, and so unproductive. Perhaps a better question would be: Under what conditions is an argument meta-frame of one kind or the other most persuasive? We think that our operationalization framework (Table 6.6) could be a useful tool to study decision maker behaviour in a number of situations, such as in strategy formulation, implementation, and strategic change (Narayanan et al., 2011). An interesting direction for future strategic cognition research would be to study whether a combined objectivistic/subjectivistic meta-frame reinforces the persuasive appeal of

an argument. Alternatively, we encourage studying the persuasive appeal of other research traditions with different meta-frames, such as appreciative inquiry (Powley et al., 2002; Bushe, 2013) and critical management research (Alvesson & Deetz, 2000).

Second, we look at another long-running debate, that over ecological validity. Basel and Brühl (2013) conclude that strategic decision maker research is lacking ecological validity as to date most of it has been based on laboratory studies of students performing artificial tasks. We address this issue by carrying out an empirical study that includes respondents who are both high and low in domain specific cognitive complexity. Our results indicate that it is possible to validly use student assessments if the fact that students are likely to provide a systematic overestimation is taken into account. Moreover, our results indicate that that systemic overestimation can be explained by cognitive complexity theory, because that theory argues that subjects with low cognitive complexity (i.e. students) are likely to be more receptive to new information than those with higher cognitive complexity (i.e. police force decision makers) (lederan et al., 2009).

What can policy makers learn from our study? What can their advisors learn that will help them in their efforts to effectively influence decision makers? We show that weak arguments are more effective in influencing decision maker implementation intention, than strong arguments, and objectivistic meta-framing is stronger than subjectivistic meta-framing. However we must bear in mind that these are the findings of but a single study. More research is needed. Understanding what persuades strategic decision makers is an important topic given their influence on our lives. Further research should investigate whether our results are found to hold true in other contexts and with other types of meta-framing.

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Appendix 6.1A Manipulation Strong AQ – Objective MF

Instructions: Carefully read the text below. Once finished, answer the questions on the following page.

The conclusions given below were taken from scientific research the goal of which was to:

- Obtaining insights on the degree of citizen acceptance of video-mediated crime reporting
- Obtaining insights on the factors that determine citizen acceptance of video-mediated crime reporting

Conclusion 1: Most citizens accept video-mediated crime reporting.

Seventy-three percent of the 224 citizens involved in the study were positive about video-mediated crime reporting, about 17% were negative, and the remaining 10% were neutral.

Conclusion 2: four factors determine a citizen's acceptance (in order of importance):

a. Usefulness of video-mediated crime reporting
b. Degree to which video-mediated crime reporting conveys human emotion
c. Attitude of police officers
d. Fear with respect to using video-mediated technology

The higher the score on the first three factors, the greater their acceptance of video-mediated crime reporting. This means that citizens who are positive about the usefulness of video-mediated crime reporting will also be positive with regard to the acceptance of this technology. On the other hand, citizens fearful of using video-mediated crime reporting (factor D) are less likely to accept this new technology.

Research approach

We used the Theory for the Acceptance and Use of Technology model (UTAUT). The factors used in the model are measured using scales validated in prior academic research. The citizens taking part in the study were randomly selected from the population of persons coming to a South Rotterdam police station to report a crime over a three-month period. Their report was made through video-mediation, not face-to-face with a police officer. After filing their report using the new technology, they were asked to fill out a questionnaire. Later reliability analysis revealed that the scales used were of sufficient reliability. Further statistical analysis, specifically, regression analysis, was used to study which factors from the UTAUT model are predictive of citizen acceptance of video-mediated crime reporting.

Appendix 6.1B Manipulation Strong AQ – Subjective MF

Instructions: Carefully read the text below. Once finished, answer the questions on the following page.

The conclusions outlined below are taken from scientific research aimed at inquiring how citizens arrive at their acceptance judgement when confronted with video-mediated crime reporting.

Conclusion 1: Most citizens accept video-mediated crime reporting, and do so in their own way.

Almost all of the citizens interviewed following their experience of reporting a crime through video mediation said that they accepted video-mediated crime reporting, describing the technology as 'just good' or 'a good idea' and adding qualifiers such as 'cool' and 'fabulous'. A small minority said things like 'it's is a bad idea' or 'I am negative about this way of crime reporting, it is not the way the police should work'.

Conclusion 2: Citizen acceptance of video-mediated crime reporting depends on how the first impression is anchored in a citizen's general belief structure. Citizens anchor in two distinct way, with distinct outcomes.

- *Path A: Citizens who are open to video-mediated crime reporting adapted swiftly and unanimously accept this technology.*

  The majority of citizens, citizens who accepted video-mediated crime reporting, follow this path. At first they said that the technology was new to them. Often they related their experience as science-fiction, saying things such as:

  "I think it's a bit like sci-fi, very cool! I am sorry, I am just being honest with you"

  Many then said that they needed to get used to a new situation, but that adapted to it quickly, and that their acceptance was swift. The following is typical:

  "At first I thought: what is this? How does it work? But soon, after some interaction with the police officer, it was just as if we were sitting in front of each other. It was just normal."

- *Path B: Citizens who stuck to their general beliefs and rejected video-mediated crime reporting.*

  A minority of citizens followed Path B. They expressed a general distrust of the police department as an institution, and were critical of the idea of investment

in ICT by the government. They said that they thought the technique was too impersonal for the reporting of a crime.

Research approach

The site of the field study was a South Rotterdam police station. A narrative interviewing strategy with a topic list was used. Every single interview was recorded word-for-word and analysed before the next interview took place. In this way the researchers' understanding grew systematically. Their impressions and conclusions were transcribed into research memos. Interviewing came to an end when no more new insights were discovered, that is, when saturation was reached. That was at 36 interviews, 3 months after the interviews had begun. Saturation was reached earlier for path A. It came later for path B as there were fewer interviewees who rejected the technology.

Appendix 6.1C Manipulation Weak AQ – Objective MF

Instructions: Carefully read the text below. Once finished, answer the questions on the following page.

The conclusions given below were taken from scientific research the goal of which was to:

- Obtaining insights on the degree of citizen acceptance of video-mediated crime reporting
- Obtaining insights on the factors that determine citizen acceptance of video-mediated crime reporting

Conclusion 1: Most citizens reject video-mediated crime reporting.

Twenty-seven percent of the 224 citizens involved in the study were positive about video-mediated crime reporting, about 63% were negative, and the remaining 10% were neutral.

Conclusion 2: four factors determine a citizen's rejection (in order of importance):

a. Usefulness of video-mediated crime reporting
b. Degree to which video-mediated crime reporting conveys human emotion
c. Attitude of police officers
d. Fear with respect to using video-mediated technology

The lower the score on the first three factors, the greater their rejection of video-mediated crime reporting. This means that citizens who are negative about the usefulness of video-mediated

crime reporting will also be negative with regard to the acceptance of this technology. On the other hand, citizens fearful of using video-mediated crime reporting (factor D) are less likely to accept this new technology.

Research approach

We used the Theory for the Acceptance and Use of Technology model (UTAUT). The factors used in the model are measured using scales validated in prior academic research. The citizens taking part in the study were randomly selected from the population of persons coming to a South Rotterdam police station to report a crime over a three-month period. Their report was made through video-mediation, not face-to-face with a police officer. After filing their report using the new technology, they were asked to fill out a questionnaire. Later reliability analysis revealed that the scales used were of sufficient reliability. Further statistical analysis, specifically, regression analysis, was used to study which factors from the UTAUT model are predictive of citizen acceptance of video-mediated crime reporting.

Appendix 6.1D Manipulation Weak AQ – Subjective MF

Instructions: Carefully read the text below. Once finished, answer the questions on the following page.

The conclusions outlined below are taken from scientific research aimed at inquiring how citizens arrive at their acceptance judgement when confronted with video-mediated crime reporting.

Conclusion 1: Most citizens reject video-mediated crime reporting, and do so in their own way.

Almost all of the citizens interviewed following their experience of reporting a crime through video mediation said that 'it's is a bad idea' or 'I am negative about this way of crime reporting, it is not the way the police should work'. A small minority said things like they accepted video-mediated crime reporting, describing the technology as 'just good' or 'a good idea' and adding qualifiers such as 'cool' and 'fabulous'.

Conclusion 2: Citizen acceptance of video-mediated crime reporting depends on how the first impression is anchored in a citizen's general belief structure. Citizens anchor in two distinct way, with distinct outcomes.

- *Path A: Citizens who stuck to their general beliefs and rejected video-mediated crime reporting.*

The majority of citizens, citizens who reject video-mediated crime reporting, follow this path. Citizens following this path tell us stories that reflect a general distrust. This distrust is directed toward the police as an institution, and towards the general distrust in government's dealing with ICT investments. Two typical reactions representative for the majority of citizens are:

"Those boys with the blue caps, nobody holds them in high regard, they chase after innocent people in sneaky ways instead of catching thieves."

"You see, government and technology makes for a bad marriage, too many things can go wrong …"

What follows is that citizens following this path value the technique to be impersonal and video-mediated communication reporting is rejected for the purpose of reporting a crime.

"I am negative about it [video-mediated crime reporting], in most situations. I prefer talking to a real person rather than using this way [video-mediated crime reporting]."

- *Path B: Citizens who are open to video-mediated crime reporting adapted swiftly and unanimously accept this technology.*

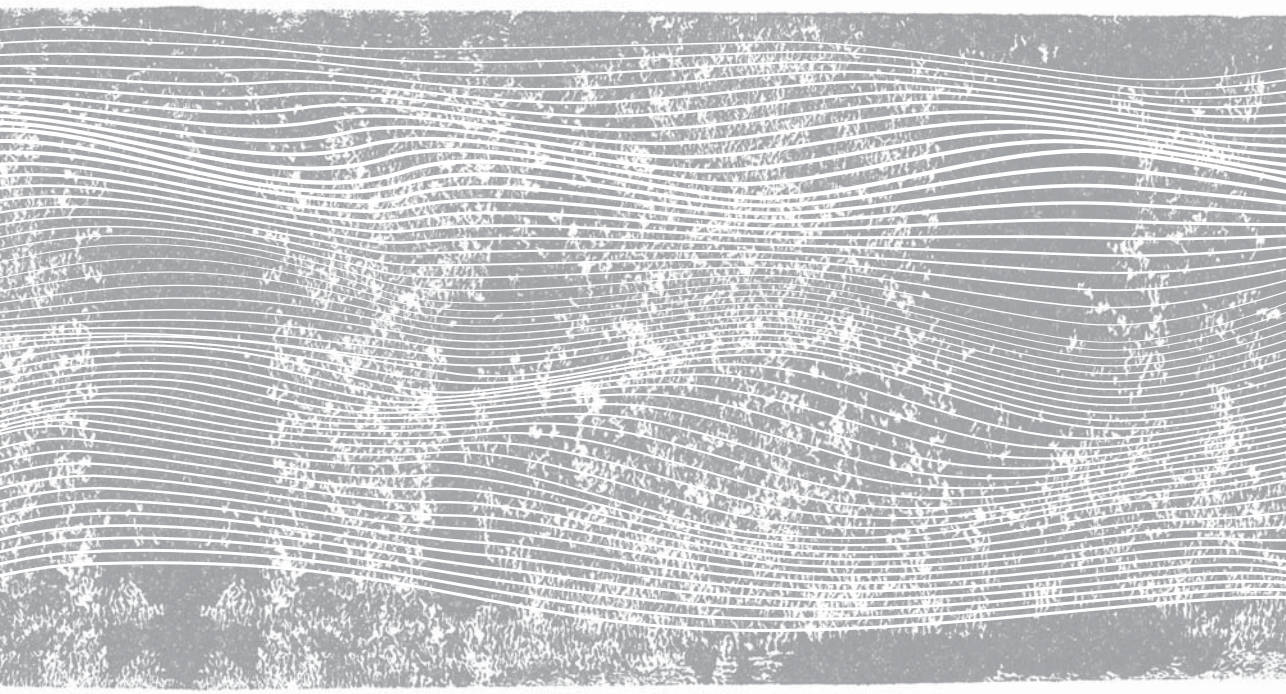
  A minority of citizens followed Path B. They expressed a general distrust of the police department as an institution, and were critical of the idea of investment in ICT by the government. They said that they thought the technique was too impersonal for the reporting of a crime.

Research approach

The site of the field study was a South Rotterdam police station. A narrative interviewing strategy with a topic list was used. Every single interview was recorded word-for-word and analysed before the next interview took place. In this way the researchers' understanding grew systematically. Their impressions and conclusions were transcribed into research memos. Interviewing came to an end when no more new insights were discovered, that is, when saturation was reached. That was at 36 interviews, 3 months after the interviews had begun. Saturation was reached earlier for path A. It came later for path B, as there were fewer interviewees who rejected the technology.

Chapter 7

Conclusion



7. CONCLUSION

This chapter combines the results of the previous chapters leading to a number of conclusions. Section 7.1 answers the research questions. Section 7.2 takes a scholarly perspective to reflect on this dissertation. It addresses this dissertation's contributions and implications, its limitations, and ends with suggestions for future research. Section 7.3 takes a practical perspective to reflect on the outcomes of this dissertation. This section discusses the practical implications for organizations and practitioners in general, and it ends with a presentation of the value of this dissertation as perceived by members of the Dutch police service.

7.1 Answers to the research questions

This dissertation was primarily aimed at studying the micro-process of information processing in strategic decision-making (SDM) in a real-life decision-making situation pertaining to IT implementation decisions at a large public, service-oriented organization: the Dutch police service. To this end, empirically generated, differentially framed first-hand insights from IT end-users at the Dutch Police service are used to study information processing of strategic decision makers. Two research questions are proposed in the first chapter of this dissertation. Both questions are relevant for practice and research, as will be further elaborated in the sections to come in this chapter. First, the question about *SDM information processing* is answered. Second, the question concerning the *end-user assessments of IT* is answered.

7.1.1 Information processing of strategic decision-makers

This dissertation aimed at shedding new light on aspects of information processing of strategic decision-makers. Combining recent insights from strategic decision-making (SDM) and human information processing (HIP) research, led to the formulation of the following research question:

> *Research question 1:*
>
> *What type of argument meta-framing, objectivistic- or subjectivistic, is most persuasive for strategic decision makers?*

A real decision-making situation and real end-user assessments of IT were used to study this first question. In chapters 3 and 5, citizens of the city of Rotterdam were invited to share their views as end-users, on a video-mediated communication device enabling the virtual taking of a crime report. At the time of evaluation, this technology had the potential to stimulate a disruptive business model change for public services, whilst public organizations facing budget cuts because of the financial crises. As a consequence, at the Dutch Police there was a growing *strategic intent* among strategic decision-makers of implementing virtual crime reporting,

potentially enabling savings on human and financial resources while maintaining customer intimacy and service quality to demanding end-users (Arvidsson, Holmström, & Lyytinen, 2014; Treacy & Wiersema, 1995). It has been generally acknowledged that acceptance of technology by the intended end-users is a key strategic asset for organizations (Walsh, 2014). For this purpose two end-user assessments studies were commissioned. These assessments were explored from an objectivistic perspective (chapter 3) and subjectivistic perspective (chapter 5). In chapter 6, these typically objectivistic and subjectivistic end-user assessments were taken as input for designing vignettes to study the impact of argument meta-framing on SDMs in an experimental setting. Prior work on paradigms (Burrell & Morgan, 1979) and arguments (Toulmin, 1958) was combined enabling the construction of typical objectivistic and subjectivistic vignettes (Table 6.6). The elaboration likelihood model of persuasion (ELM) was used to theoretically ground the research question. This model was chosen because of its long standing and prominent theoretical robustness that explains how arguments are most effectively used in explaining and predicting human decision-making of (e-) consumers, patients, and citizens (Hoeken & Hustinx, 2009; Shen & Bigsby, 2013). This model was theoretically extended and empirically replicated. Replication was done by analysing the proposed positive relationships between argument quality (strong/weak), and source credibility and attitude change, in the context of SDM's implementation intentions. The model was extended by incorporating two moderators, argument meta-framing and domain specific cognitive complexity. Both moderators were proposed to positively moderate the effect between argument quality and implementation intentions. The extended model was tested using two respondent groups, which differed in their domain specific cognitive complexity (DSCC): strategic decision makers of the Dutch Police (high DSCC) and master students of Tilburg University (low DSCC). The hypotheses stated in chapter 6 were convincingly confirmed.

Furthermore, the central hypothesis in ELM, i.e., strong arguments have a positive direct effect on an SDM's change in implementation intentions, was taken to the test. The experiment provided typical strong- and weak arguments for the implementation decision and it was concluded that strong arguments were indeed more persuasive: having a positive- and direct effect on a decision maker's change in implementation intentions. The effect was also confirmed to work in the opposite direction; weak arguments have a boomerang effect (i.e. a negative direct effect on change in intentions to implement). Regarding the effect size, it was observed that a weak argument's boomerang effect on strategic decision makers is significantly larger, than the positive persuasive effect of strong arguments. According to these empirical results, the research question about SDM information processing is answered as follows.

It was hypothesized that strong arguments are more persuasive for a decision maker to change his/her implementation intentions when these arguments are framed in an objective,

as compared to a subjectivistic, argument meta-framing. This hypothesis was not confirmed directly, it could only be confirmed when the source of the information was regarded as highly credible by the decision-maker. To put differently, when source credibility is regarded as high, objectivistic meta-framing leads to higher change in implementation intentions as compared to subjectivistic meta-framing. This is the case for both strong (persuasive effect) and weak (boomerang effect) arguments. Again, the boomerang effect induced by weak arguments was significantly larger in coefficient size than the persuasive effect induced by strong arguments. Finally, for both strong and weak arguments, decision makers with high DSCC were generally less likely to change their implementation intentions, when compared with decision makers low in DSCC. Having answered this dissertation's first research question, we now move to answering the second research question pertaining end-user assessment research.

7.1.2 Complementarity of subjectivistic – and objectivistic IT end-user assessment research

From the literature covered in the introduction chapter of the dissertation, we learned that first-hand insights about end-users of IT are a key strategic asset for organizations today (Walsh, 2014) and that organization employ a rich tapestry of research methods and approaches (Wade & Hulland, 2004). Taking a closer look at the field's heterogeneity, it becomes clear that knowledge about an end-user's technology assessment is developed in detached and possibly competing objective and subjective research paradigms (Becker & Niehaves, 2007; Hirschheim, Klein, & Lyytinen, 1996; Hirschheim & Klein, 1989; Wicks & Freeman, 1998). This competition may hinder the field's ability to accumulate knowledge (Cordoba, Pilkington, & Bernroider, 2012). Furthermore, taking into account that besides on-going theoretical discussion, there is ample empirical support that multiple paradigm research could indeed be instrumental to accumulate knowledge about end-user assessments of technology. Therefore, with the wish to inspire this standing theoretical discussion, this dissertation brings the standing theoretical discussion to the empirical level by asking the following question:

> *Research question 2:*
>
> *In what ways can objectivistic and subjectivistic end-user assessments of IT complement another?*

In this dissertation, Burrell and Morgan's (1979) seminal work which is one of the most highly cited works in Organisation Theory (Hassard & Cox, 2013),[1] was used as the main source to define objectivistic and subjectivistic research as two alternatives for sociological analysis. Their

1 In March 2015 Google Scholar counts over 9,000 citations for Burrell & Morgan's Sociological paradigms and organizational analysis.

four-dimensional analysis scheme for sociological and organizational analysis (Figure 1.2, Table 6.1 and 6.2) provided the basis for constructing two ideal-types; objective and subjective end-user assessment research. The ideal typical forms of sociological analysis are in turn operationalized and explored in empirical research settings. In the light of the second research question, the interplay between the objectivistic (2 and 3) and subjectivistic chapters (4 and 5) of this dissertation was found to reflect three dualisms, or three (pairs of) concepts, which touch upon three major themes in theorizing about IT end-user assessment.[2] First, there is the *cognition – affection* contrast, which expresses two opposing attitudinal dimensions (Ajzen, 2005). The second pair of contrasts enabled a distinction between *specific – general beliefs,* two opposing end-users' belief structures. Third, the *universal – contextual* contrast enables distinguishing between different levels of generalizability of research findings. Below the complements for each pair of opposites are discussed individually, by describing how results from individual chapters contrast and connect with one another regarding the focal pair of contrasts.[3]

First, the interplay of the objective and subjective acceptance studies (chapter 3 and 5) provided a renewed sensibility whether acceptance of technology was a matter of the head (cognition) or the heart (affection). In chapter 3, it is revealed that current technology acceptance research heavily relies on cognitive predictors, as opposed to affective predictors (Table 4.3). In the case of virtual crime reporting, affective predictors, like social presence and anxiety, are found to be of equal importance to UTAUT's cognitive predictors in explaining technology acceptance.

In the subjective acceptance study of virtual crime reporting (chapter 5), it was found that none of UTAUT's cognitive factors and theoretical mechanisms, which were used in a semi-open coding frame, surfaced in the citizens' narratives. Furthermore, UTAUT was extended with an affective construct, social presence, which turned out to be the second strongest predictor in the study presented in chapter 3. Surprisingly, in chapter 5 an almost exact copy of the *social presence* construct (chapter 3) was omnipresent in the subjective study of virtual crime reporting. In the natural language of the respondents' narratives (chapter 5), the three indicators of the social-presence construct were readily available to express both positive and negative assessments of citizens. Table 7.1 summarizes this connection.

Secondly, the interplay of the objective and subjective acceptance studies (paper 4 and 5) provided a renewed sensibility whether acceptance of technology was a matter of general or of specific beliefs. Current technology acceptance models as reviewed in chapter 4 (Table 4.2) rely solely on specific beliefs about the technology under evaluations, like performance – and effort

2 Without making the claim to be complete, because complements are likely to be many, and depend at large on the researcher's lens.

3 Methodology for contrasts (differences) and connections (commonalities) are discussed in section 1.4.

Table 7.1 Social presence: the close connection between objective measurement (semantic differential) and subjective appraisals (translations of exact quotes taken from Table 5.8)

Objectivistic measurement		Subjectivistic appearance	
Warm	Cold	"It felt like a warm bath."	"My impression is it's colder. I find the contact colder."
Human	Inhuman	"I didn't get the impression that I was talking to a computer or a TV screen. I felt it was very human."	"It's all about screens nowadays… man is so often put in second place."
Personal	Impersonal	"One is able to establish real contact, very well! I Find it really personal."	"That screen makes it impersonal. It's impersonal, which I regret very much."

expectations, and the social influence which an end-user beliefs to receive from his colleagues and/or supervisors. The subjectivistic study of technology acceptance (chapter 5) revealed that the necessary condition to accept or reject virtual crime reporting lies in the general belief structure of citizens and had little, if anything, to do with the end-users specific beliefs about the technology. By contrast, chapter 5 showed that specific evaluations of the technology to be citizens' projections seeking to affirm their own general beliefs. So, what does this result tell us? With regard to theorizing about IT end-user assessment the results from chapter 5 bring a renewed attention to the impact which general beliefs (i.e. the anchoring) have in technology acceptance, that is: the initial anchoring strategy taken both enables and constrains the way that specific beliefs about a technology and hence acceptance can be assessed.

Third, a comparison between the information system (IS) success constructs (explored in chapter 2) with the police officer's concourse about IT support (explored in chapter 4) reveals some differences and commonalities between a model with *universal* value, the IS success model, and a model with *contextual* value; the police officer's concourse about IT supporting their work. Table 7.2 visualizes this comparison, from which the following can be observed. The items police officers put forward seem to fit the broader categories obtained from the literature study presented in chapter 2. Taking a closer look at the distribution of the police officers' items across IS success dimensions, it becomes apparent that there is a rich variety of items expressing a system's quality, information quality and net benefits.[4] However, police officers did not come up with items mentioning use, satisfaction or experience, and perceptions of top management support. From this comparison of constructs (chapter 2) with items (chapter 4), it

4 Chapter 4 dealt with the question about the police's IT in general, these aspects of systems' quality and information quality can easily be expanded when inquiring dedicated IS with specific end-user groups. Making this list of information- and system quality considerably more specific, diverse and large in size.

Table 7.2 Confrontation of research results from chapter 2 (IS success constructs obtained through literature review) and chapter 4 (police officers' q-deck items obtained through a work-conference with 57 participants)

IS success dimension and constructs (chapter 2)		
Dimension	IS construct	Police officer's Q-deck (chapter 4)
IS related	System quality	Systems' appearance (7) System sign on (14) Mobile working (15) Coherence between systems (16) Working procedure in system (17) Ability to use new media (18) Navigating the system (20) Speed of systems (25) Use of multimedia files (26) Simplicity of systems (27) System flexibility (28) Number of systems (19)
	Information quality	Accuracy of data (2) Completeness of data (3) Availability of data (6)
	Net benefits (individual and organizational impacts)	Sharing knowledge with colleagues (9) Digital filing (10) Search systems (12) Sharing data with colleagues (13) Amount of data-entry (22) Implementation of new systems (11) Software innovation (21)
	Service quality	ICT support service (1) Assistance with use of systems (4)
	Use	
	User satisfaction	
User related	Participation	Focusing on the user (23) Participation in ICT development (24)
	Involvement	Focusing on the user (23)
	Training	Training for system use (5)
	Skills	Consistency with own knowledge & skills (8)
	Experience	
Context	Facilitating conditions	(See service quality)
	Organizational impact	(See net benefits)
	(Perceptions of) top management support	

becomes quite clear the IS success models reviewed in chapter 2 are quite wide-ranging and thus useful in structuring the many expressions of IS related, user related, and context related dimensions of IS success. The comparison also reveals that a wide-ranging model requires further operationalization for application in the Dutch Police service and in other contexts as Seddon (1997) already suggested. So at the start of the inquiry a complementarity between both research paradigms, a refined picture of complementarity was found on three major dualism that are highly embedded in IT end-user research. So by answering research question 2, it is shown that end-user assessment research is both a matter of head and heart, general beliefs and specific beliefs, and it was illustrated how universal and local knowledge may intersect.

7.2 Contribution of the dissertation to the literature

This section discusses the dissertation's major contributions and implications, its limitations and suggestions for future research in the next three paragraphs.[5]

7.2.1 Contributions & implications

In this subsection, the dissertation's general contributions are stated and their implications discussed. The first part of this subsection presents three major contributions to the micro-foundations movement in organizational research. That is, this dissertation provides empirical insight into the persuasive appeal of objectivistic over subjectivistic arguments in the context of strategic decision-making about IT. Another significant contribution is the whole system methodology (developed and applied in chapter 4) for sensing organizational opportunities. Lastly, this study is one of the first to provide clarity, through empirical research, into what extent student samples can be validly used as substitutes for strategic decision-makers in strategic cognition research.

In the second part of this subsection, this dissertation's contributions to multiple paradigm research are stated. Adopting a multi-paradigm approach, this study contributes to the extensive body of knowledge by broadening the conceptual scope of theorizing technology acceptance by individuals. This dissertation demonstrates that current research orientations in technology acceptance research are partial because they systematically stress just one side of three pairs of opposites. That is, current technology acceptance models centralize the importance of: universal concepts over contextual concepts, the cognitive attitudinal dimension over the affective and specific beliefs about a technology over general beliefs that might impact technology acceptance.

5 Although some slightly modified versions of chapters 2-6 have been published or submitted elsewhere, I took the lead in all steps of the inquiry process for each individual chapter in this manuscript.

Finally, this dissertation's contribution to multiple method research is stated. This dissertation provides an empirical example as on how methodologies can be mutually strengthening, while elimination their weaknesses. These contributions are elaborated below.

Unpacking some micro foundations of strategic decision-making about IT

First, this dissertation contributes to the micro-foundations discussion, which has found increased attention in strategy and organization theory over the past decade (Felin, Foss, & Ployhart, 2015). This stream of micro-foundations initiatives is designed to (Felin et al., 2015:1):

> *'unpack collective concepts to understand how individual-level factors impact organizations, how the impact of individuals leads to emergent collective and organizational level outcomes and performance, and how relations between macro variables are mediated by micro actions and interactions'*.

This movement complements the existing literature of strategy and organization theory in several ways. It brings in a renewed sensitivity that individuals situated at multiple organizational levels are intimately linked in analyzing the collective phenomena of interest in strategy and organization theory. The micro foundations movement also provides a call for bringing the human component back into strategic and organizational analysis. The micro-foundations movement can thus be regarded as a response to an overemphasis on macro factors in strategy and organization research, hence disregarding individual level and inter-subjective interaction into strategic and organizational analysis (Felin et al., 2015).

This dissertation uniquely contributes to the micro-foundations discussion by bringing individuals like citizens, police officers and decision-makers back into the analysis. A rich and detailed understanding of the multiple and interrelated cognitive perspectives situated on multiple organizational levels is provided incorporating police officers and citizens as the IT end-users of IT as well as strategic decision-makers; all involving in complex technological change in a public service organization. In other words, this dissertation serves to unpack three major fields of interest in the macro foundations movement. This dissertation also provides insight into the persuasive appeal of objectivistic over subjectivistic, arguments for strategic decision-making, it provides a whole system methodology for sensing organizational opportunities, and thirdly into the ecological validity of using student samples as substitutes for strategic decision-makers.

The persuasive appeal of objectivistic over subjectivistic arguments for strategic decision-making

In this dissertation it is uncovered that strategic decision-makers tend to be persuaded more strongly by objectively framed information than subjective framed information when making IT investment decisions, under the condition that the informational source is found to be credible. What does this imply for our theoretical knowledge about the micro foundational approach of SDM information processing? At the outset of this dissertation, still little was known about the persuasive *effects* of qualitatively different arguments on strategic decision-makers (Basel & Bruhl, 2013; Gigerenzer & Gaissmaier, 2011; Hodgkinson & Starbuck, 2008). This study threw a first light on the effects of differential meta-framing of arguments in SDM information processing. Adopting a dual processing perspective from human information processing (HIP) literature, this study is also among the first to test a theoretically grounded way of looking at a standing and unresolved debate about what evidence type (statistics or narrative) is more persuasive in general HIP research (Hoeken & Hustinx, 2009; Shen & Bigsby, 2013).

This study also contributes to the study of heuristics in strategic cognition (SC) research. The role of heuristics is increasingly acknowledge in SDM research (Loock & Hinnen, 2015), to date however it remains unclear which role[6] heuristics actually play in SDM information processing (Basel & Bruhl, 2013; Gigerenzer & Gaissmaier, 2011; Hodgkinson & Starbuck, 2008). Authors therefore advocate an integrated view of the three heuristic programs for SC research because the diverse views can by means of their diverse analytical foci complement one another (Bingham & Eisenhardt, 2014; Loock & Hinnen, 2015). For this purpose, SC scholars stress the potential for applying dual process modeling, such as the elaboration likelihood model (ELM), in SC research (Basel & Bruhl, 2013). This study was one of the first to successfully apply and extend such a dual process perspective in SC research, which also led to a renewed conceptualization of the multiple roles a heuristic might play in strategic decision-maker's information processing, as is outlined next. Following ELM's multiple roles postulate a variable can serve as an argument (effortful/central processing), as a peripheral factor (effortless/peripheral processing), and as a factor affecting (biasing) the amount or direction of elaboration on a message (middle range processing) (Crano & Prislin, 2008). Applying this multiple roles postulate to the three heuristics in SC, we find that the effortless processing is emphasized by the heuristics and biases program (Tversky & Kahneman, 1974) and the fast and frugal program (Gigerenzer & Todd, 1999). The consideration that heuristics require effortful processing is emphasized by the simple rules program (Bingham & Eisenhardt, 2011). No SC research was found however mentioning the notion of heuristics in relation

6 Depending on the amount of initial elaboration, a variable in elaboration likelihood modelling can serve as an argument (high elaboration), as a peripheral cue (low elaboration), and as a factor affecting the amount or direction of elaboration (middle range elaboration).

to *middle range processing*. This is where this dissertation's results come in. The graphical examination (Figure 6.4A) of the moderating effect of objectivistic argument meta-framing between argument quality (strong and weak) and strategic decision maker's implementation intentions is indicative[7] of *middle range elaboration*. Figure 6.4A depicted that decision makers are persuaded more by objectivistic arguments, especially for strong arguments (biased persuasion through argument meta-framing's moderating effect). This implies that this study shows that heuristics might also serve so called *middle range elaboration*, thus as a factor affecting the amount (effortful/effortless) or direction (positive/negative impact on attitude change) of information processing. Therewith this study complements the standing three heuristics programs by empirically demonstrating that *middle range processing*, could represent a third alternative alongside effortful and effortless processing. Moreover, applying ELM's three-tiered multiple roles postulate by itself helps to understand the connectedness of SC's heuristics programs from a more unifying perspective, which SC researchers are recently calling for (Basel & Bruhl, 2013).

Providing a whole-systems methodology for sensing organizational opportunities

Bringing police officers' views to the forefront of the analysis shows how the lower level roles (i.e. micro foundations) assist in organizational-level dynamic capabilities of *sensing*[8] organizational opportunities (Teece, 2007). The combined Appreciative Inquiry (AI) and Q-methodology (QM) (chapter 2) enables detailed understanding of the end-users' needs and wisdoms (Nonaka & Toyama, 2007), and thus provides a whole systems *sensing* methodology equipped to incorporate all kinds of (lower level) roles.

This becomes apparent in the vivid imagery (Figures 4.3-4.6) in chapter 4 that explicates the contrasts and connections between four police officer viewpoints regarding their IT support. Why is this combined methodology such a useful micro-foundational methodology to sense organizational opportunities? This combined AI/QM methodology has four main advantages. Firstly, this methodology is useful as an organizational wide sensing methodology, because sensing is not just left to a few individuals, rather it enables opening-up sensing activities up to span (potentially) the entire eco-system involved (Bushe, 2013; Felin et al., 2015; Teece, 2007). This combined AI/QM methodology is furthermore most effective in dealing with the

7 An important methodological tool in ELM is studying the systematic variation of argument quality on an attitude change, when moderated by a third variable. This enables ELM researchers to study *how* the third variable influences the amount of message processing. Following this methodological toolbox's logic, the pattern in Figure 6.4A provides proof that there is high and slightly biased elaboration due to argument meta-framing. This is regarded indicative of middle range processing (Bohner & Wanke, 2002).

8 Teece (2007) distinguishes between three sequential dynamic capabilities, that is: sensing, seizing and managing.

notion that consumers and end-users are often the first to sense the need for applying new technology (Nonaka & Toyama, 2007). The application of this methodology as a sensing device also aids in developer's understanding of customer/end-user's needs, of which research consistently reports high correlation with success of innovations (Freeman, 1974; Teece, 2007). Fourth and final, in chapter 4 it became apparent that end-user consultation enabled *wholeistic* organizational topics to surface and gain platform, which could ordinarily not. One such example is the low coherence between two entirely separate information systems supporting law enforcement and criminal investigation, the two organization subsystems comprising the Dutch police service (Figure 2.6). Such an integral topic was difficult to sense, and/or bring to the foreground prior to this research. In part, because both the police service as well as the IT functions involved in these organizational functions are separated along the functional lines creating two organizational subsystems; that is law enforcement and criminal investigations.

Hence, as this dissertation shows, micro-foundation research might also aid in *sensing* how well an organization maintains a balance between integration and differentiation tendencies in our increasingly complex organizations (Lawrence & Lorsch, 1967). This combined AI/QM methodology enhances an organization's *dynamic capability*, the ability to sense organizational opportunities, and thus to sustain itself and/or be successful (Teece, 2007). Put differently, this study developed and tested a sensing methodology that can be applied on any (inter) organizational level.

Ecological validity of using student samples as substitutes for strategic decision-makers

This study also contributes to the ongoing discussion on using student samples in describing, explaining and predicting strategic decision maker's attitude and behaviour (Narayanan, Zane, & Kemmerer, 2011). In many strategic cognition studies, student samples are potentially too naively used to infer decision-maker attitudes and decision-maker behaviour. There was no empirical evidence found, that tests the ecological validity of working with student samples in SC research (Basel & Bruhl, 2013). This dissertation provides empirical evidence to compare responses from students' and decision-makers' identical manipulations in experiments. Incorporating domain specific cognitive complexity (DSCC) as a moderator variable enables an empirical examination of this discussion. Hence, this dissertation provides empirical insights as to similarity of student (low in DSCC) and strategic decision-maker (high in DSCC) responses to informational inputs. This dissertation's results provide backing that student samples can reliably be used as substitutes for strategic decision-makers, as long as one keeps in mind that student samples are likely to provide an overestimation of the attitude or behaviour a decision-maker would provide (see Figure 6.4). So getting a feel for the level over overestimation at work is important here.

Paradigm interplay as a multi-paradigm research strategy to accumulate knowledge

This section discusses the major contributions of this dissertation to multiple-paradigm theorizing about IT end-user assessment. Henceforth, we reflect on the implications of this dissertation's findings. First, this dissertation's major contributions are spelled out, by showing that this study's paradigm interplay strategy indeed aids as a research strategy to accumulate new knowledge about IT end-user assessment research. Next, the implication of this contribution is discussed.

With the aim of studying the complementary nature of the objectivistic and subjectivistic (O-S) research traditions present in the field of IT end-user assessment, the O-S dualism was kept in a *dynamic tension* throughout the research process. In other words, no a priori stance for either side of the O-S dualism was taken, or either one of the lenses depicted in Figure 1.2. This approach could be regarded *dynamic* because over time the researcher moved back and forth between positions/logics for the purpose of gaining maximal understanding from within (following through), and between (contrasts and connections) both positions/logics (Chen & Hirschheim, 2004; Schultz & Hatch, 1996). The word *tension* is used in this context to emphasize that this dissertations' main interest was in preserving the tension between commonalities and differences at the paradigmatic level (ontology, epistemology, methodology, human nature) in order to theorize IT end-user assessment in new ways (Burrell & Morgan, 1979; Schultz & Hatch, 1996). This simultaneous recognition of contrasts and connections between paradigms is coined an interplay strategy (Schultz & Hatch, 1996). This interplay strategy holds the middle ground in what is termed the paradigm incommensurability debate. In this debate, the different views range between a viewpoint that paradigms are completely impermeable versus a viewpoint that paradigms are completely permeable (Hassard & Cox, 2013). The possibility of multi-paradigm research, in the fields of organization- and information sciences, has been extensively discussed and reviewed in the past decades (Cordoba et al., 2012; Deetz, 1996; Donaldson, 1990; Gioia & Pitre, 1990; Goles & Hirschheim, 2000; Hardy & Stewart, 1997; Hassard, 1993; Hassard & Cox, 2013; Hirschheim & Klein, 1989; Pozzebon, Mackrell, & Nielsen, 2012; Wilmott, 1993). Different views have been provided about the possibility for multi-paradigm research. Scholars adhering to paradigm inpermeability, or incommensurability, emphasize the differences between paradigms and underemphasize or reject the possibility for commonality search between paradigms. Those adhering to paradigm integration emphasize the commonalities. Hence, differences are underscored or even ignored. Adopting an interplay strategy moves us away from this either/or type of reasoning, to a both-and type of reasoning (Schultz & Hatch, 1996), consequently opening up the analytical possibility to analyse paradigmatic differences and commonalities. This research strategy thus safeguards the integrity of each individual paradigm to remain intact, and while travelling back and forth, it also enables attending the

tension regarding the objectivistic and subjectivistic paradigms' differences and commonalities.[9] This approach to inter-paradigm research thus uses the inter-paradigm tensions constructively[10] to theorize about IT end-user assessment in new ways.

What new ways of theorizing did the paradigm interplay strategy enable? This interplay between the objectivistic (2 and 3) and subjectivistic chapters (4 and 5) of this dissertation was found to reflect three dualisms, or three (pairs of) concepts which, touching upon three major themes in theorizing about IT end-user assessment.[11] As pointed out in section 7.1, current theorizing centralizes the importance of universal concepts, that are cognitive in nature, and pertain specific beliefs about the technology. This dissertation's multiple paradigm research approach reveals that these research orientations are partial because they stress just one side of three pairs of opposites. The interplay between chapter 3 and 5 revealed that technology acceptance is a matter of both *cognition* and *affection*, thus a matter of both brain and heart. In chapter 5 it was revealed, by adopting Tversky & Kahneman's work on anchoring and adjusting (Mussweiler, 2003; Tversky & Kahneman, 1974), that *general beliefs* both enable and constrain an individual's range of appreciating a technology's *specific beliefs*. Furthermore, the research revealed that universal and contextual concepts are often closely linked. For example, in chapter 5, the citizen narratives mirrored the dimensions of the social presence construct (Table 7.1).

What does this imply for the field of IS end-user assessment research? This dissertation is one of the first to provide compelling empirical evidence that multiple paradigm research can indeed be used most effectively to accumulate knowledge for the field of IT end-user assessment. Hence, the power of the subject–object antonym has by no means been eroded, as do some authors suggest (Cunliffe, 2011). By holding a dynamic tension between the objective and subjective studies in this dissertation, the three dualisms discussed at length above surfaced. Establishing that for end-user assessment research the subjective-objective antonym is still very much alive, as a constructive force, enabling this dissertation's contributions to theorizing about IT end-user assessment. Further evidence that the subjective-objective antonym is still very much alive comes from the clear preference that strategic decision-makers provided for objectivistic over subjectivistic arguments (in chapter 6), because if argument framing would not be meaningful, it would not have made a meaningful difference in strategic decision-makers' implementation intentions, as it did.

9 Thus taking in a large portion of both the integrationists' and incommensurablists' analytical foci, except possibly for the extreme incommensurablist and - integrationist views in this debate.

10 This dissertation has no interest in accepting, clarifying or resolving the differences and contradictions of paradigms, since others discuss this at length in the past decades.

11 Without making the claim to be complete, because complements are likely to be many, and depend at large on the researcher's lens.

So, starting with the observation that first-hand insights about end-users of IT is a key strategic asset for organizations today (Walsh, 2014) it was found that IT end-user assessment research formed a rich tapestry of diverse research methods and approaches (Wade & Hulland, 2004). However the knowledge about an end-user's technology assessment is developed in unconnected, sometimes even viewed as competing, so-called objective and subjective research paradigms (Becker & Niehaves, 2007; Hirschheim et al., 1996; Hirschheim & Klein, 1989; Wicks & Freeman, 1998). This state of affairs can hinder the field's ability to accumulate knowledge (Cordoba et al., 2012). This dissertation showed many ways in which multiple-paradigm aids to accumulate knowledge, it therewith hopes to inspire other researchers to pursue (some form of) multi-paradigm research, some research suggestions are provided in section 7.3.

Strengthening research methods through mixed-methods approach

Lastly, the combination of multiple research methods in chapter 4, provided an empirical example as to how methodologies can be mutually strengthening, while eliminating their weaknesses. Moreover, the comparison between chapter 2 and 4 results, and chapter 3 and 5 results, provided key insights as to how combined methodologies lead to complementary results regarding the cognitive-affective, general-specific, universal-contextual dimensions of IT end-user assessment research.

7.2.2 Limitations

Below the key limitations of this study are addressed. The limitations of chapter 2 center around the methodological choices made. The qualitative assessment of meta-studies and meta-analysis deployed in chapter 2 might limit the possibility for detailed inquiry into interdependencies among (information system success) constructs, because it might be the case that context specific elements, such as type of system, -user and -use, are lost when comparing meta-studies and meta-analysis instead of using actual data. The conclusions drawn from this analysis did however not necessitate a more refined picture about the exact amount of relationships found in all empirical studies published. Furthermore, it has to be remarked that especially for those constructs with a smaller amount of occurrences (ease of use, intention, attitude) slight deviations across studies made the construct easily belong to the mixed-results category. This decision rule for the discovery of mixed results could lead to biases. However for the purpose of this study this was not regarded as problematic because it would at the most lead to a slightly more conservative estimation, with regard to the actual amount of convergence that occurred in IS success research. Lastly, assessing meta-studies to construct a general picture of Information System Success and its antecedents, inevitably has implications for the sensitivity (possibility to detect and include) very recent and single IS

studies, which are often not widely agreed and therefore (not yet) tested upon in meta-studies. Using meta-analysis, instead of a qualitative assessment of meta-analysis and reviews, could have resolved the limitations discussed considerably.

The combination of the specific video-mediated technology and the small sample used in chapter 5 might raise some concerns, for example about the robustness of the chapter's findings. However, the patterns found provide a robust view of the similarity (n=33) and dissimilarity (n=3) paths, because of the marginal added value additional interviews added to the theoretical understanding of the researchers, which was recorded in the research memos. For both paths full theoretical saturation was reached after 36 interviews. Moreover, the actual proportion of non-adjusting citizens, relative to adjusting citizens is also quite similar to what was observed in the sample. That is roughly every 10th participant in our sample was a non-adjusting citizen, whereas there were 3 non-adjusting citizens out of 36 in the sample. Despite these considerations, the sample used is rather small, which might imply that our findings might be not representative for the entire population.

7.2.3 Future research suggestions

In this section, research suggestions are provided to increase our understanding of the micro foundations of strategic decision-making, multi-paradigm research, and multi-method research.

Micro foundations of strategic decision-making

To move our micro-foundational understanding of SDM information processing forward four suggestions for future research are provided: replication of this study; advancing our understanding regarding the impact of argument meta-framing; the use of students samples to study strategic decision-making and the application of dual process models in SC research.

Replication of this study

This study took place in a public organisation, its decision-maker behaviour is often explained with prospect theory (Rainey, Ronquillo, & Avellaneda, 2010), roughly stating that (Levy, 1992) people tend to overemphasize losses instead of gains. When faced with loss, people tend to accept risk to avoid loss, but when in pursuit of gains, people tend to be risk-averse. This decision-making tendency becomes visible in Figure 6.4A. where it can be observed that weak arguments in this study indeed lead to higher (and negative) attitude change than stronger arguments, hence this figure is indicative for the strategic decision-makers at the Dutch Police are more risk averse than opportunity driven. Following prospect theory, overemphasizing losses instead of gains could explain some of this study's results (Figure 6.4A), and could probably be different in a business setting because decision-makers in those settings are more likely to act

risk-seeking than avoiding losses (Rainey et al., 2010). It is therefore recommended to replicate the research model for external validity reasons. Other contexts could comprise but are not restricted to strategic decision-making situations, such as IT and non-IT related, and strategic decision makers in other public organisations as well as in business. Such replicating could help facilitating what information processing elements in SDM are universal across decision-makers embedded in different decision-making contexts, and what might be unique to specific decision-making contexts or specific strategic decision-makers. In addition, it is recommended to shift the level of analysis from individual to group, because strategic decision-making is (often a highly) nested process. Shifting from the individual to the group level the study of 'how heuristics are shared' among strategic decision-makers can therefore usefully be pursued. Bingham & Eisenhardt assume for example SDM groups learn and refine their organization specific 'portfolio of heuristics'. The empirical studies inquiring the shared basis of SDM groups (Bingham & Eisenhardt, 2014; Loock & Hinnen, 2015) provide promising results. Lastly, although the individual and group levels of analysis span a tremendous difference of scholarly disciplines, it is recommended to study their complementarity through individual inquiries, as well as thematic reviews covering the role of heuristics in SDM information processing from both levels of analysis.

Advancing our understanding regarding the impact of argument meta-framing

Secondly, this dissertation throws new light on the unresolved debate in human information processing literature over which evidence type is most persuasive, as it highlights the decision-makers' preference for objectivistic over subjectivistic argument meta-framing. However, no single study could settle such a general question. Actually, what was found is: "it depends". This study shows that which evidence type is most persuasive is contingent upon context, decision maker's cognitive complexity and belief about the credibility of the source, and of course, on argument quality. Thus it may be the case that the question of whether statistical or narrative evidence is more persuasive is too simplistic. Perhaps a better question is: under what conditions is an argument meta-frame of one kind or the other most persuasive? The operationalization framework (chapter 6, Table 6.6) could be a useful tool to study decision maker behaviour in a number of situations, such as in strategy formulation, implementation, and strategic change (Narayanan et al., 2011).

Another interesting direction for future strategic cognition research would be to study whether a combined objectivistic/subjectivistic meta-frame reinforces the persuasive appeal of an argument. Alternatively, it is encouraged to study the persuasive appeal of other research traditions. In the light of strategic decision maker's preference to react more strongly on weak arguments then on strong arguments a comparison between framing of arguments in a critical

(Alvesson & Deetz, 2000), and appreciative (Bushe, 2013; Powley, Cooperrider, & Fry, 2002) way can be an interesting avenue to pursue. A reason could be that critical meta-framing might make the weak argument even more persuasive for strategic decision-makers, whereas the appreciative/affirmative meta-framing is typically sensitive to finding and exemplifying the positive core, which might make strong arguments even stronger. Lastly, for those adhering to the notion that organizational analysis has to shift to *post-paradigm times*, deploying alternative meta-framing labels are suggested to advance our understanding of meta-framing. Inspiration can for example be found in Hassard and Cox's multilateral distinction between structuralism, anti-structuralism and post-structuralism (Hassard & Cox, 2013).

The use of student samples to study strategic decision-making

Third, this dissertation addressed another long-running debate, namely that on ecological validity of using student samples to infer strategic decision-maker's attitude an behaviour from. Basel and Brühl (2013) conclude that SDM research is lacking ecological validity, because most of SDM research is executed in laboratories involving students often performing artificial decision-making tasks. This issue was addressed in this dissertation by carrying out an empirical study that includes respondents who are both high (decision makers) and low (students) in domain specific cognitive complexity. The results from chapter 6 indicate that it is possible to use student assessments in a valid way, if the fact that students are likely to provide a systematic overestimation is taken into account. So it is suggested to continue a combined student and decision-maker research designs, in naturalistic settings, to find out whether this study's findings last. If they last it is suggested to use student samples for reasons of efficient data-collection, because their inclusion into a study is much easier organized. Of course, keeping in mind potential biases such as the tendency to overreact leading to overestimation of effects, as this dissertation demonstrated.

The application of dual process models in SC research to clarify the role of heuristics

In SC research, heuristics have received a lot of attention in the past few years (Loock & Hinnen, 2015). Three complementary research programs have been pursued, the heuristics and biases, fast & frugal, and the simple rules programs leading to unequivocal results (Bingham & Eisenhardt, 2014; Vuori & Vuori, 2014). This study was one of the first to apply the elaboration likelihood model of persuasion (ELM), a dual process model, in the context of SC research. This enabled new ways of studying the role of arguments, argument meta framing and heuristics yielding new insights. From this first application it is therefore recommended to further application of ELM in the context of SC research to advance our understanding about how strategic decision-makers process information.

Multi paradigm & Multi-methods(s)

For the aspiring scholar wishing to take on multi-paradigm research two future research suggestions are provided. However, to make constructive use of the inter-paradigm tensions two conditions need to be taken in account. First, following dual process type reasoning an individual's *willingness* and *ability* to travel in-between paradigms without taking an a-priori research stance is required (Petty, Rucker, Bizer, & Cacioppo, 2004). Second, sufficient academic training to execute and communicate multi-paradigm research (Cordoba et al., 2012; Galliers & Huang, 2012) is needed to guarantee high quality research and high quality results. Assuming that these conditions are met to a reasonable degree, it is suggested that other paradigm crossing strategies could be employed. In addition to the interplay strategy deployed in this dissertation, one could pursue a sequential-, parallel-, or bridging strategy, each with their unique analytical capabilities as outlined next. The sequential paradigm crossing strategy, where one paradigm research strategy is executed after another, can be used where one aims one paradigm to inform another. Exemplar is Lee's work (1991) who used interpretive methods, to inform functional research. Second, the parallel paradigm crossing strategy applies multiple paradigms in separate and equal terms. Keeping the paradigms in isolation, the analytical focus is on differences and conflicts between paradigms (Schultz & Hatch, 1996). An exemplar study is Hassard's multiple paradigm research at a fire service (Hassard, 1991). Third, a bridging paradigm crossing strategy is distinct from sequential- and parallel paradigm crossing strategies in that the boundaries between paradigms are not left in tact. The bridging strategy assumes paradigm permeability, assuming there are transition zones between paradigms (Gioia & Pitre, 1990), allowing for inter-paradigm communication. By using second order concepts such as structuration and organizing, paradigm boundaries are said to disappear, and paradigms become indistinguishable. Hence the analytical focus tends to emphasize similarity over difference (Schultz & Hatch, 1996). So the aspiring researcher has lots of strategies to pursue inter-paradigm research all serving distinct analytical interests and thus potentially serving distinct goals.

Lastly, following the successful combination of appreciative inquiry and q-methodology in chapter 4, it is recommended to ceaselessly search and apply different (combinations) of methodologies. First of all, because applying a multi-method research strategy can serve as a means to strengthen individual methodologies. Furthermore, keeping a continuous open eye towards applying multiple research methods, also serves as a means to prevent an overreliance on one familiar methodology (i.e. the law of instrument). When such overreliance on a familiar methodology is at hand, research endeavors risk to center around a specific methodology instead of the research phenomenon (Maslow, 1966). Or as Maslow once stated (1966:15):

> *"I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail"*.

7.3 Value for practitioners

This final section addresses this dissertation's practical value. First, the practical implications for organizations and practitioners in general are presented, followed by an informed assessment of the value of this dissertation for the Dutch police service.

7.3.1 Implications for organizations and practitioners in general

Below, the implications of each individual chapter for organizations and practitioners are presented. Chapter 2 provided a state of the art insight as to what causes and comprises IT to be successful from the perspective of IT end-users. It is recommended for organizations wanting to estimate how successful their ITs are in the light of their end-users to use one or more of the IS success criteria (such as: IS satisfaction, intention to use and actual use). It can be concluded from this chapter that for ITs to find sustained implementation, one could invest on participation and involvement of end-users, providing training and providing end-user support. Because these factors are of direct and positive influence on an IT's success. It is therefore highly recommended to take these considerations into account when preparing and managing IT implementations.

The combined AI/QM approach, presented in chapter 4, can serve as a sensing methodology to discover organizational opportunities and potential risks from different stakeholder groups (Teece, 2007). It is, therefore, recommended for policy advisors and strategic managers, keen to deploy a sensing methodology that as especially capable of making constructive use of negative emotions in large scale settings, to use the combined AI/QM approach. Furthermore, it is recommended to follow a full AI cycle (discover, dream, design and deliver) to fully bring the people back into sensing, seizing and managing organizational opportunities and risks (Bushe, 2013; Teece, 2007).

From chapter 3 flow the following recommendations for practitioners. Considering the broad range of crimes reported using Video-mediated communication (VMC) in the chapter four study, it is reasonable to suggest that VMC could successfully be used in delivering many other kinds of public services, and also to enable the delivery of service towards long wanted customers/citizens' needs and wishes. For example, as a result of the cost reduction involved in crime reporting, the police service can now more easily service in the evening and at night, a long time citizen wish. In this way, not only costs reduction can be accomplished, re-investing some of the saved costs even enabled improving servicing provision towards citizens. Second, investing in a virtual technology for the provision of a public service is a strategic decision in which a trade-off, between what Treacy and Wiersema (1995) call customer intimacy and operational efficiency, is made. The use of VMC in crime reporting is exceptional in that it provides both a high level of customer intimacy, through the high social presence of the

medium, while at the same time also increasing operational efficiency by pooling all of the resources needed to take crime reports in one shared service center (Strikwerda, 2010). While the Dutch police authority is adopting the reporting of crime virtually, and some Dutch municipalities and health care providers are experimenting with other ways to deliver services virtually, the application of VMC in other contexts might not have the same kinds of outcomes. It is suggested to organizations considering service delivery virtually to first determine the extent to which customer intimacy and operational efficiency are required and to carefully consider ease of use and affective criteria, especially social presence. In this study, it was found that the quality with which the technology mediates the communication process between actors during the process of delivering a public service is important. It is shown that affective predictors explain to a considerable extent acceptance and use of virtual technologies by public service users. Hence, the technology itself has direct and substantial impact on the communication process between members of the public and the service provider, and thus on the acceptance of a virtually delivered service. Third, the technology should be easy to use. In this study, the technology was so easy to use that experience with related technology, which is a common predictor in conventional technology acceptance models, lost its predictive value entirely.

In chapter 5 is elaborated on the development of a process model deducted from practice, which not only complements the UTAUT model applied in chapter 3, but it is also useful for practitioners involved in actually implementing and optimizing virtual service provision. From this study follow two recommendations. First, practitioners using virtual technologies in human service settings could consider the ways in which the technology can convey and transmit emotions such as warmth, sociability and humanness (i.e. social presence). Over 90% of our participants indicated that they relied exclusively on these factors in forming their judgment to accept the technology. Second, it is advised that the training of those who will be delivering services through virtual technologies emphasize the importance of the moment of first contact with the virtual technology in light of the fact that attitudes about the technology are swiftly formed, and that anchoring plays a pivotal role in attitude formation. Establishing eye contact and providing a warm welcome, i.e. maximizing the impact of social influence on acceptance are crucial in creating the feeling that the technology is a valid way of mediating human contacts and emotions, i.e., in maximizing the impact of social presence on acceptance.

Lastly, this research shows that weak arguments are more effective in influencing a strategic decision-maker's implementation intention, than strong arguments, and objectivistic meta-framing is stronger than subjectivistic meta-framing. This dissertation demonstrated that citizens' first-hand insights indeed influence decision-makers' implementation intentions and it is uncovered which factors and processes play a role in persuasion of strategic decision-makers. Although, we must bear in mind that these are the findings of but a single study.

Nevertheless, the insights are relevant for policy makers and advisors seeking to effectively influence strategic decision-makers. Also for strategic decision-makers the findings are relevant because it shows how framing of an argument might influence their information processing and hence decision-making.

7.3.2 Valorisation for the Dutch police service

As was set out in this dissertation's introductory chapter, incorporating the first-hand insight from police officers and citizens alike are of key strategic importance to the Dutch police service (Stuiveling & Schoten van, 2011; Walsh, 2014). This dissertation set out to gain experience as to how to tap into such first-hand insights, and henceforth to provide recommendations to the Dutch police service about the use of citizens' and police officers' first-hand insights in strategic decision-making processes concerning technological innovation. This section shows that recommendations for the Dutch police service have already found implementation. In other words, to a certain extent this research has already shown it value for stakeholders in society.

To support this statement, quotes from different members of the Dutch police service are presented below. For this purpose, the Chief Information Officer, the Deputy Head of information management, the former head of intake and service unit of Rotterdam-Rijnmond area, and the head of the software development, each highlight the practical value of findings presented in this dissertation and its spin-off. Chapters 2-5 of this dissertation have provided the Dutch police service with a theoretical and methodological toolbox, and a source of inspiration, to enrich its IT decision-making and development practices with first-hand insights from their IT end-users. In this dissertation, multiple paradigmatic perspectives have been used providing more open (chapter 4 and chapter 5) and closed ended (chapter 2 and 3) evaluation frames to capture end-users' first-hand insights. Currently, these practices have found implementation at the Police into one standing research program, the 'IT Experience Monitor', which was initiated in 2013 by the chief information officer (CIO). At that moment in time the CIO had just been appointed and asked me to develop a methodology with which IT end-users' first-hand insights could be acquired and monitored over time, because he felt he was lacking these informational inputs to perform his task. This assignment gave me the unique opportunity to implement some of this dissertation's results in policing's IT practices. The experience monitor consists of three complementary perspectives adopting insights from this dissertations' literature study (chapter 2) to monitor the impact of IT on its end-users in general terms, the combined AI / QM study (chapter 4) to enhance decision-making with first-hand insights, and the validated UTAUT model to assess the impact of individual IT projects on its intended end-users. This program is (in part) a response to a call from the Dutch court of Audit to enhance the Police's IT decision-making and development with end-users' experiences (Stuiveling & Schoten van,

2011). Looking back, the Chief Information Officer is greatly satisfied with the so-called IT experience monitor:

> *"The Experience Monitor has objectified my work; hence it provides certainty in discussions, which is one of the main reasons why I value this experience monitor greatly. It is also valuable to be able to have access to the employee's [Police officers] opinions and follow trends over time. … To know the employee's [police officers] insights is valuable for example in prioritizing IT initiatives. Also it is of great use to account for our efforts improving the police service's IT."*
>
> *Chief Information Officer of the Dutch Police Service,*
> *February 2015*

The extended UTAUT study in chapter 3 enabled a citizen acceptance study of video-mediated communication in crime reporting. The information from this study led strategic decision makers to make an investment decision, which led to a successful implementation of this technology. While maintaining high citizen demands this technology enabled saving EURO 4.5 million on organizational resources annually with an investment of EURO 3 million and estimated annual cost of EURO 0.4 million (Police, 2010). The head of the intake and service unit of the Rotterdam-Rijnmond Police service can still recall what the information from this study enabled in persuading several different mayors, to decide to implement video-mediated as a means to report crimes in their municipality:

> *"I can still remember that the regional board of mayors of the Rotterdam-Rijnmond region, were at the outset sceptical about implementing virtual crime reporting because they were intuitively a bit worried about their citizens' treatment when their contact with the police service was mediated through this type of technology. When I told the mayors that academic research revealed that more than 80% of all citizens were accepting this technology, a paradigm shift happened. The conversation instantly moved away from a discussion about whether it was or was not a good idea to implement such a technology, to when implementation could be planned, and why it takes so long! Looking back, the information from the academic evaluation simply overtook the different kinds of opinions of individual decision makers. So it happened, that it was the first time, at least that I can recall, that decision-making about police work was directed by academic inputs … it was also the first time in my career that citizens' opinions truly guided the decision-making process. That was a major achievement of your research."*
>
> *Former head of the intake & service unit of the Rotterdam-Rijmond Police Service,*
> *Currently IT program manager at the Dutch Police service,*
> *March 2015*

The combined appreciative inquiry (AI) and q-methodology (QM) research approach, chapter 4, provides the Dutch police service with a methodology capable of making constructive use of negative sentiments (cynicism, irony, etc.) about the object of evaluation for the betterment of Dutch Police service's IT. The methodology's essence, asking unconditional constructive questions is received as very useful, also among software developers:

> *"The Experience Monitor has changed our work significantly. Before we did not know as clearly for whom we developed software. The Experience Monitor has helped us feeling and understanding what police officers' IT related needs are, and how these needs are differentiated amongst police officers. The experience monitor aids us to ask questions and listen, instead of assuming to know the needs of police officers and develop from that point onwards."*
>
> *Head of software development department at the Dutch police service, February 2015*

The combined methodology AI/QM turned out to be a real revelation for the Dutch Police service's management. This methodology is now part of the Police Force's IT Experience Monitor, and the methodology is repeated annually on different topics/themes. The deputy head of information management says about this methodology:

> *"Both the content and the presentation [Figures 4.3-4.6] were a real eye-opener to us [management] to have an objective insider's view regarding how policing's IT was viewed by the police officers. … You see, this was the first time that we undertook an inquiry into the police officers' perceptions of their IT's… It also provided us with key-leads as to what needs to be improved from the perspective of the police officers. … A next step [in the development of the experience monitor] could be to make the evaluations more real-time, meaning there is hardly any delay between inquiry and presentation of the results."*
>
> *Commissioner of this dissertation and Deputy Head of Information management at the Dutch Police service, March 2015*

Last, but not least this, this dissertation provided citizens and police officers the opportunity to express their voice in SDM processes about IT, which is very much valued in current Dutch society. This becomes apparent through the high response rates, online questionnaires topped at 69%, and also through the positive appraisals police officers typically expressed about their participation into the inquiries performed in this dissertation and the experience monitor as a spin-off. Valuable things will emerge from incorporating such first-hand insights in SDM

information processing, as this dissertation has shown in many ways, and as police officers already know from their experience…

> *"Giving us [police officers] a say in [IT] development has not occurred before, while we have the actual experience from IT usage. So it is useful to get this info from us."*
>
> *Anonymous detective, Dutch police service, unit Rotterdam*

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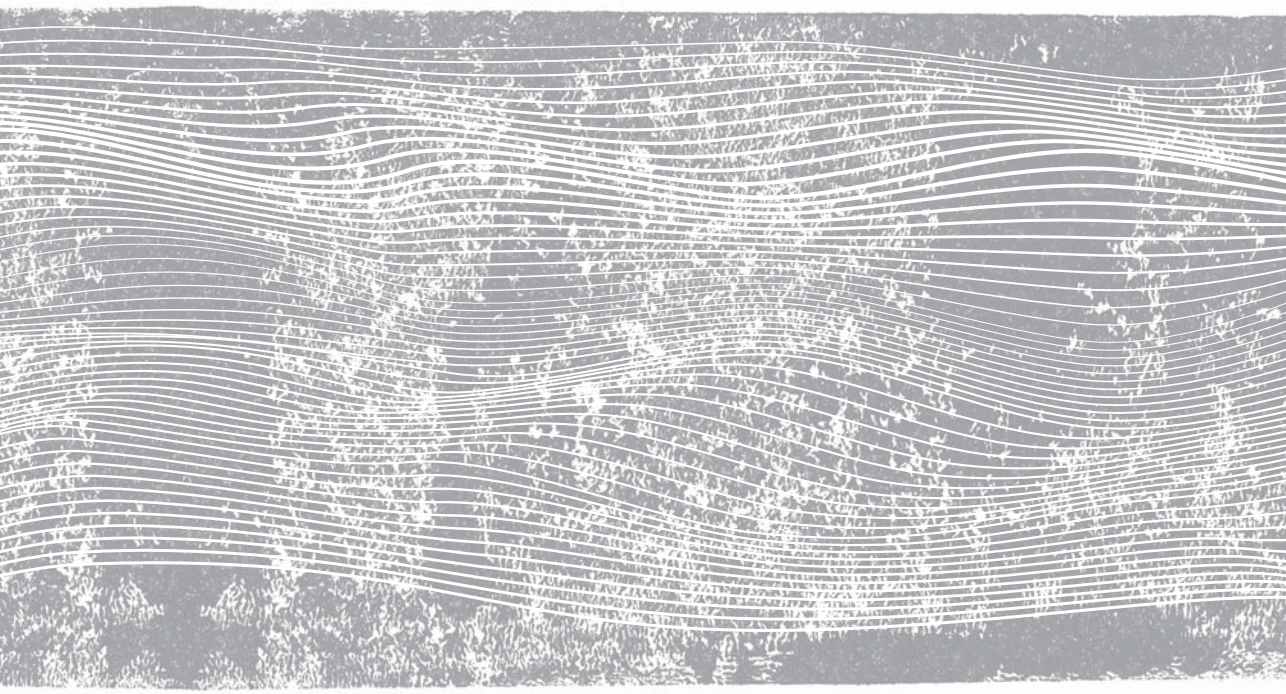
7

Samenvatting



SAMENVATTING

Deze promotiestudie beoogt het inzicht in het vraagstuk hoe strategische besluitvormers beïnvloed kunnen worden door informatie uit evaluaties van eindgebruikers van informatietechnologie (IT) te vergroten.

Aanleiding

Formele en informele evaluaties van eindgebruikers, gebaseerd op reflecties op en ervaringen met het gebruik van IT in het dagelijkse werk, kunnen relevante informatie opleveren die vervolgens gebruikt kan worden in strategische besluitvormingsprocessen. Wetenschappers geven immers aan dat de potentie van IT voor een organisatie beter benut kan worden als deze voldoende ingebed is in de praktijk van alledag (Arvidsson, Holmström, & Lyytinen, 2014). Deze IT-eindgebruikersevaluaties kunnen conventionele besluitvormingsinformatie zoals schattingen van kosten, baten en risico's, niet alleen verrijken maar ook betrouwbaarder en informatiever maken. De praktijkinformatie uit evaluatie van IT-eindgebruikers kan bijvoorbeeld helpen bij de vraag of besteding van schaarse publieke middelen zinvol is. Ook geeft het inbrengen van informatie uit evaluaties van IT-eindgebruikers aan het besluitvormingsproces, in deze studie gaat het om burgers en politiemensen, deze IT-eindgebruikers letterlijk een stem. Het benutten van informatie uit evaluaties van IT-eindgebruikers in strategische besluitvorming over IT is echter niet vanzelfsprekend (Elias, Ulenbelt, Fokke, Bruins Slot, & Meenen van, 2014; Stuiveling & Schoten van, 2011). Bovendien is het ook niet eenvoudig. Bij een organisatie zoals de politie kent de IT vele eindgebruikers; zo'n 63.000 politiemensen, vele ketenpartners en talloze burgers. Het effectief beluisteren van zoveel IT-eindgebruikers is complex. Binnen een verzameling IT-eindgebruikers is er namelijk een grote variëteit aan verschillende stemmen aanwezig, daarbij is de (mogelijke) representatie van deze stemmen divers (statistisch, narratief).

Vraagstelling

Om duidelijk te krijgen hoe informatie uit evaluaties van burgers en politiemensen strategische besluitvormers kunnen beïnvloeden bij het maken van IT-gerelateerde beslissingen, heeft deze studie twee microprocessen en hun onderlinge relatie onderzocht op basis van empirisch onderzoek bij de politieorganisatie. De twee microprocessen gaan over hoe IT geëvalueerd wordt door haar eindgebruikers en hoe strategische besluitvormers (deze) informatie verwerken in besluitvormingspraktijken. Om deze microprocessen en hun relatie te doorgronden, is steeds bestaande literatuur geanalyseerd, op nieuwe manieren gecombineerd en verrijkt aan de hand van praktijkcases.

Microproces 1: Informatieverwerking van IT-gerelateerde strategische besluitvorming

Om het begrip van en inzicht in informatieverwerking door strategische besluitvormers te vergroten is in deze studie de, in consumentenonderzoek veel toegepaste, dual-processing literatuur (Chaiken, 1980; Petty & Cacioppo, 1986) gebruikt en uitgebreid naar de context van strategische besluitvorming. Deze literatuur kent een lange historie en is effectief gebleken in het verklaren en voorspellen van menselijke besluitvorming door bijvoorbeeld consumenten, patiënten en burgers. Niet toevallig werd er recent ook aanbevolen om de inzichten van dual-processing literatuur toe te passen om het begrip van informatieverwerking van strategische besluitvormers te vergroten, maar deze aanbeveling wordt tot op heden weinig tot niet uitgewerkt (Shen & Bigsby, 2013). Daarnaast blijft tot op heden een vraagstuk in de dual-processing literatuur onopgelost. Het gaat om de vraag welk type bewijs, statistisch of narratief, het meest persuasief is bij strategische besluitvorming. Tot op heden leiden onderzoeksresultaten namelijk tot dubbelzinnige antwoorden (Hoeken & Hustinx, 2009; Shen & Bigsby, 2013). Deze studie bekijkt dit vraagstuk opnieuw, maar dan vanuit een ander perspectief. Deze studie legt niet alleen de nadruk op het type bewijs, maar plaatst het type bewijs in een argumentstructuur waar het immers een onderdeel van uitmaakt. Dit wordt gedaan door inzichten uit de argumentatieleer over de elementen van een praktisch argument (Toulmin, 1958) te combineren met de dimensies waarop paradigma's onderling van elkaar verschillen (Burrell & Morgan, 1979). Hieruit volgt dat een statistisch bewijs een onderdeel vormt van een typisch objectivistisch argument meta-frame. Maar ook dat narratief bewijsmateriaal past bij een subjectivistisch argument meta-frame. Hierdoor kan in deze studie een andere vraag gesteld worden dan welk bewijsmateriaal het meest persuasief is, namelijk:

> *Welk meta-frame, objectivistisch of subjectivistisch, van een argument is het meest persuasief voor strategische besluitvormers binnen de politieorganisatie?*

De studie naar informatieverwerking van strategische besluitvormers is in deze studie 'gevoed' door het verschillend 'framen' van evaluaties van burgers en politiemensen over politie-IT, het tweede microproces waarop deze studie zich concentreert.

Microproces 2: IT-eindgebruikersevaluatie

Het onderzoeksveld van eindgebruikersevaluatie van IT is omvangrijk en kent een zeer rijke variatie van onderzoeksmethoden en -paradigma's (Wade & Hulland, 2004). Kennisuitwisseling tussen verschillende onderzoeksparadigma's vindt in dit onderzoeksdomein echter slechts zelden plaats, terwijl de potentie van het bij elkaar brengen van mogelijk complementaire inzichten uit verschillende onderzoeksparadigma's groot is (Becker & Niehaves, 2007; Chen & Hirschheim, 2004; Cordoba, Pilkington, & Bernroider, 2012; Hirschheim, Klein, & Lyytinen,

1996; Hirschheim & Klein, 1989). Om inzicht te krijgen in de potentie van deze combinaties, onderzoekt deze studie de volgende vraag empirisch:

> *Op welke manieren kunnen objectivistische en subjectivistische IT-eindgebruikersevaluaties elkaar aanvullen voor IT-gerelateerde besluitvorming?*

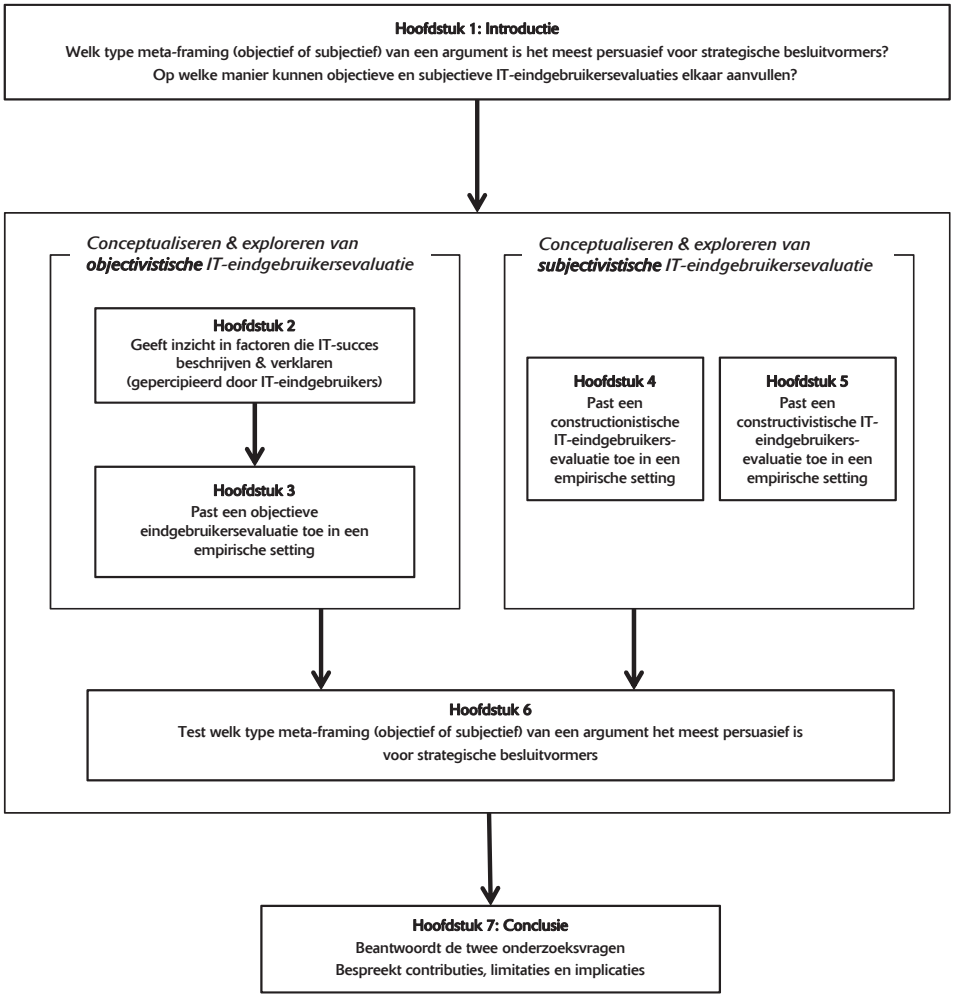
Onderzoeksaanpak

In beide onderzoeksvragen wordt een onderscheid gemaakt tussen objectivistische en subjectivistische meta-framing. Dit onderscheid staat voor verschillende sociaalwetenschappelijke paradigma's. Om dit onderscheid te onderzoeken is daarom ook voor een multi-paradigmatisch en multi-methode onderzoeksdesign gekozen. Elk paradigma kent namelijk zijn eigen assumpties over de aard van de werkelijkheid (ontologie), hoe deze werkelijkheid onderzocht kan worden (epistemologie), over de aard van de menselijke natuur en over de centrale methodologische focus (Burrell & Morgan, 1979). Als gevolg wordt in het objectivistische paradigma taal (en getal) beschouwd als een spiegel van de werkelijkheid. In het subjectivistische paradigma wordt taal beschouwd als een vehikel om werkelijkheid te construeren, hetgeen een impressionistisch beeld geeft van de werkelijkheid.

Om de complementariteit van deze onderzoeksparadigma's te onderzoeken wordt vanuit bovengenoemde onderzoekstradities empirisch onderzoek gedaan, waarna de resultaten met elkaar vergeleken worden. Zo wordt in de hoofdstukken 2 en 3 het IT-eindgebruikers-onderzoek vanuit objectivistisch perspectief verkend en in de hoofdstukken 4 en 5 vanuit het subjectivistische perspectief. In hoofdstuk 6 komen de resultaten van deze studies bijeen in een realistisch besluitvormingsexperiment waarmee onderzoeksvraag 1 beantwoord kan worden. De besluitvormingssituatie (in dit experiment) betreft overigens de substitutie van face-to-face aangifte doen door virtueel aangifte doen[1] met behulp van een videosignaal. De weerslag van deze aanpak is gevisualiseerd in Figuur 8.1.

Om onderzoeksvraag 1 te beantwoorden zijn typische objectivistische (hoofdstuk 3) en subjectivistische (hoofdstuk 5) evaluaties door burgers, als eindgebruikers van de virtuele aangifte, in een besluitvormingsexperiment toegevoegd aan reeds aanwezige conventionele besluitvormingsinformatie zoals kosten, baten en risico's. Met deze informatie is de persuasiviteit van objectivistische en subjectivistische argument meta-framing op strategische besluitvormers

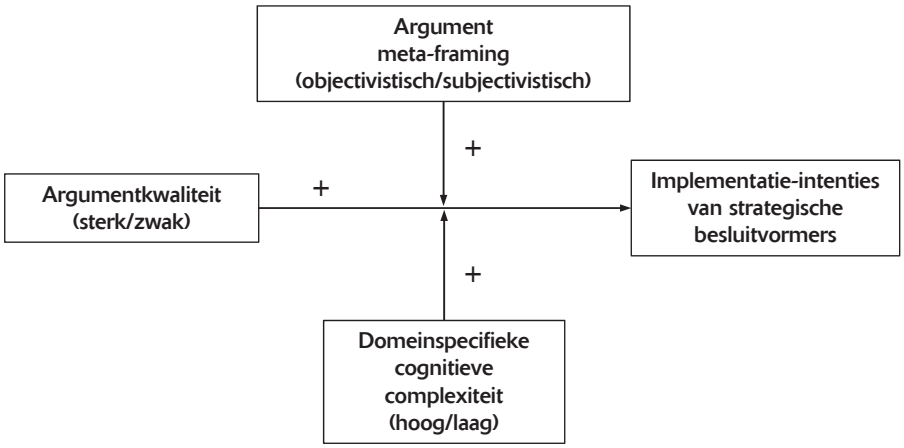
1 Virtueel aangifte doen: in deze casus is virtualiteit onderzocht als een situatie waarin de burger aangifte doet op een politiebureau, waarbij de interactie tussen burger en politieambtenaar *gemedieerd* wordt door een real-time videosignaal, waardoor onder meer oogcontact maken mogelijk is en een rijke/driedimensionale projectie van de ander gepresenteerd wordt in de fysieke ruimte. Terwijl de andere dus niet fysiek aanwezig is.



Figuur 8.1 Opbouw van deze studie.

onderzocht in een experimentele setting (hoofdstuk 6). Meer specifiek is hiervoor het 'elaboration likelihood model of persuasion' (ELM) in hoofdstuk 6 gerepliceerd en uitgebreid om de implementatie-intenties te onderzoeken van politiebesluitvormers op basis van de gepresenteerde informatie (Figuur 8.2).

Replicatie van ELM is gedaan door het directe effect van argumentkwaliteit (sterk/zwak) op (verandering in) implementatie-intenties van besluitvormers empirisch te onderzoeken. Sterke



Figuur 8.2 Conceptueel model (uit hoofdstuk 6).

argumenten zijn argumenten die een implementatiebeslissing positief beïnvloeden, zwakke argumenten zijn argumenten die een implementatiebeslissing negatief beïnvloeden. Uitbreiding van dit model vond plaats door toevoeging van twee moderatoren, argument meta-framing en domeinspecifieke cognitieve complexiteit (DSCC), die allebei verondersteld zijn de relatie tussen argumentkwaliteit en implementatie-intenties positief te beïnvloeden. Argument meta-framing is als variabele geoperationaliseerd door werk over paradigma's (Burrell & Morgan, 1979) en argumentstructuur (Toulmin, 1958) te combineren. Hierdoor zijn vier typisch objectivistische (sterk en zwak) en subjectivistische (sterk en zwak) vignetten geconstrueerd vanuit het resultaat van empirisch onderzoek uit hoofdstuk 3 en 5 (Tabel 6.6). DSCC is onderzocht door twee verschillende respondentengroepen van elkaar te onderscheiden, te weten politiebesluitvormers (hoog in DSCC) en masterstudenten van Tilburg University (laag in DSCC). Geloofwaardigheid van de bron, leeftijd en geslacht zijn gemodelleerd als covariaten.

Onderzoeksvraag 2 is beantwoord door de resultaten van hoofdstukken 2 & 3 en 4 & 5 bij elkaar te brengen in een analyse van overeenkomsten en verschillen van verkregen inzichten. Ook hier is het werk van Burrell & Morgan (1979) gebruikt om het objectivistische en subjectivistische paradigma betekenisvol te kunnen onderscheiden in twee ideaaltypen (Figuur 1.2, Tabel 6.1 en Tabel 6.2). Een interplaystrategie is gebruikt om te onderzoeken op welke manier deze paradigma's elkaars complement zijn (Schultz & Hatch, 1996).

Conclusies

In hoofdstuk 7 worden de twee onderzoeksvragen van deze studie beantwoord, gebruikmakend van het resultaat van de individuele hoofdstukken.

Welk argument meta-frame is het meest persuasief?

De eerste onderzoeksvraag *'welk meta-frame (objectivistisch of subjectivistisch) van een argument is het meest persuasief voor strategische besluitvormers?'* kan op verschillende manieren beantwoord worden.

Het korte antwoord is: objectivistische argument meta-framing is meer persuasief voor strategische besluitvormers. Dit effect kan echter alleen vastgesteld worden als de besluitvormer de informatiebron als geloofwaardig beschouwt, als dit niet het geval is, dan is er geen verschil in persuasiviteit tussen objectivistische en subjectivistische argument meta-framing.

Er is ook een langer antwoord. De centrale hypothese van het toegepaste onderzoeksmodel (Figuur 1.2) veronderstelde allereerst dat sterke argumenten meer persuasief zijn voor besluitvormers (een positief en direct effect hebben op implementatie-intenties) dan zwakke argumenten. Deze hypothese is bevestigd. Het omgekeerde is ook bevestigd, namelijk dat zwakke argumenten een negatief direct effect hebben op implementatie-intenties; het zogenaamde boemerangeffect. De effectgrootte van de zwakke argumenten is groter dan de effectgrootte van de sterke argumenten. De hypothese (Figuur 2.2) waarmee vervolgens de eerste onderzoeksvraag is onderzocht, veronderstelt dat sterke argumenten de implementatie-intenties van strategische besluitvormers positief beïnvloeden, wanneer deze sterke argumenten geframed worden in een objectivistische argumentstructuur. Dit interactie-effect is niet direct geobserveerd. Dit effect is wel bevestigd onder de conditie dat de bron van de informatie als geloofwaardig ingeschat wordt door de strategische besluitvormers. Dus, als de informatiebron als geloofwaardig wordt beoordeeld, dan zijn objectivistisch geframede argumenten inderdaad meer persuasief voor strategische besluitvormers. Dit geldt voor zowel zwakke als voor sterke argumenten. Ook hier is de effectgrootte van zwakke argumenten groter dan van sterke argumenten. Dus ook hier is het boemerangeffect groter dan het persuasieve effect.

Als laatste is uit hoofdstuk 6 op te maken dat strategische besluitvormers (hoog in DSCC) hun implementatie-intenties vergelijkbaar uiten, in reactie op de aangeboden vignetten, als studenten dat doen (laag in DSCC), maar zich minder aanpassen (Figuur 3.2).

Vullen objectivistisch en subjectivistisch IT-eindgebruikersonderzoek elkaar aan?

De tweede onderzoeksvraag in dit onderzoek luidt: *op welke manieren kunnen objectivistische en subjectivische eindgebruikerevaluaties van IT elkaar aanvullen voor IT-gerelateerde besluitvorming?* In deze studie zijn drie dualismen gevonden waarop beide onderzoeksparadigma's elkaar aanvullen.

Allereerst geeft de interplay tussen de objectivistische en subjectivistische burgeracceptatiestudies (hoofdstuk 3 en 5) een nieuwe inzicht betreffende het vraagstuk of eindgebruikers van IT nu juist het hoofd (cognitie) of het hart (affectie) gebruiken bij het evalueren van IT. Zo wordt in hoofdstuk 3 de *Unified Theory for the Acceptance and Use of Technology* (UTAUT) toegepast en uitgebreid met social presence om de acceptatie van virtuele aangifte te onderzoeken (Short, Williams, & Christie, 1976). In dit hoofdstuk is blootgelegd dat de onafhankelijke variabelen in acht geëvalueerde technologieacceptatiemodellen veelal en soms zelfs uitsluitend cognitief van aard zijn (Tabel 3.3). Terwijl ditzelfde hoofdstuk met empirisch materiaal aantoont dat zowel affectieve voorspellers als ook cognitieve voorspellers een groot aandeel hebben in het verklaren van acceptatie van videogemedieerd aangifte doen. Dit blijkt bijvoorbeeld uit de observatie dat bij acceptatie van virtuele aangifte door burgers de affectieve predictor *social presence*, na *performance expectations*, de belangrijkste factor is voor acceptatie van burgers voor de onderliggende videotechnologie. Ter aanvulling hierop onderzoekt hoofdstuk 5 met behulp van narratief onderzoek het technologie-acceptatieproces bij individuele burgers. In dit hoofdstuk komen geen van de veelal cognitieve UTAUT-mechanismen terug in de opgetekende narratieven, wel worden de dimensies van *social presence* een-op-een teruggevonden.

Het tweede dualisme maakt ons gevoelig voor de notie in welke mate IT-eindgebruikers zich laten leiden bij hun evaluatie van IT door (hun) algemene overtuigingen en/of door een grondige evaluatie van specifieke aspecten van de technologie. Uit hoofdstuk 3 blijkt dat de huidige technologie-acceptatieliteratuur enkel gebruik maakt van specifieke overtuigingen die gaan over de te evalueren technologie, zoals het gebruiksgemak en de bruikbaarheid van een bepaalde technologie (Tabel 3.2). Uit de resultaten van hoofdstuk 5 kan ook geconcludeerd worden dat de noodzakelijke voorwaarde voor acceptatie of afwijzing van burgers voor videogemedieerde aangifte, ligt in zijn/haar algemene systeem van overtuigingen. De eindgebruikers van de geëvalueerde IT zoeken namelijk in het eerste contact met de technologie eerst naar een herkenningspunt (anchoring) in hun eigen algemene overtuigingen (Tversky & Kahneman, 1974). De manier waarop deze verankering gebeurt, bepaalt vervolgens de (on) mogelijkheid tot aanpassing ((non-)adjusting) en dus uiteindelijk acceptatie of afwijzing van het gebruik van video bij het doen van aangifte. Zo koppelt een kleine groep burgers hun eerste indruk van de technologie aan een algemeen wantrouwend beeld van de politie of een

algemeen negatief beeld van de combinatie overheid en IT-projecten. 'Gewapend' met deze algemene overtuigingen passen deze burgers hun algemene beeld niet aan (non-adjusting) bij verdere interactie met de technologie en uiteindelijk wijzen ze deze vervolgens unaniem af. Bij de meerderheid van de burgers die deze technologie in hoge mate accepteert verloopt het proces anders. De eerste ervaring van deze groep met de technologie wordt gekoppeld aan het sciencefiction-genre. Vervolgens ontvouwt zich een proces van aanpassen aan de technologie waarna deze groep burgers unaniem de technologie accepteert bij het doen van aangifte. Op basis van het onderzoeksresultaat van hoofdstuk 5 is een procesmodel ontwikkeld, geïnspireerd op besluitvormingsliteratuur (Mussweiler, 2003; Tversky & Kahneman, 1974). Dit model is complementair aan de inzichten opgedaan via de huidige (variantie)modellering in technologie-acceptatieliteratuur, omdat hierin enkel specifieke evaluaties gebruikt worden om acceptatie te verklaren. Het ontwikkelde procesmodel (Figuur 5.5) laat als complement zien dat de spreekwoordelijke kiem voor acceptatie of rejectie voor het gebruik van video bij het doen van een aangifte ligt in het microproces van verankeren, dus in het algemene systeem van overtuigingen van een individu.

Het derde dualismepaar betreft het analyseniveau waar naartoe gegeneraliseerd kan worden, dat wil zeggen: is de geproduceerde kennis universeel van toepassing of is deze contextueel, dus onlosmakelijk verbonden met de omgeving waarin deze kennis tot stand gekomen is? Een vergelijking van de universele set constructen die een proxy zijn voor informatiesysteem succes uit hoofdstuk 2, met de contextuele q-deck items van politiemensen uit hoofdstuk 4, geeft een rijk beeld hoe universele en contextuele constructen met elkaar verbonden zijn (Tabel 6.2). Uit deze tabel kan opgemaakt worden dat de universele constructen uit hoofdstuk 2 ruimere categorieën zijn voor de constructen van politiemensen uit hoofdstuk 4. Ook kan vastgesteld worden dat andere universele constructen uit hoofdstuk 2 helemaal niet voorkomen in het discours van politiemensen (hoofdstuk 4), denk hierbij aan *gebruik, ervaring, tevredenheid* en *ondersteuning van topmanagement*. Als laatste kan geconstateerd worden dat sommige universele categorieën, zoals kwaliteit van het systeem, rijker ingevuld worden in de q-deck items die het discours van politiemensen omvatten. Concluderend zijn er dus vele verbindingen tussen de universele en contextuele constructen te maken, zorgvuldigheid lijkt echter geboden bij het vertalen van lokale constructen naar universele constructen en andersom.

Theoretische waarde

De resultaten beschreven in deze studie geven een unieke set toevoegingen aan de zogenaamde 'micro-foundations'-stroming in de sociale wetenschap, het multi-paradigmatisch onderzoek en het multi-methodisch onderzoek.

In algemene zin draagt deze studie bij aan de microfoundations-discussie, omdat de mens, als burger, politiemens en strategisch besluitvormer weer teruggebracht wordt in de analyse (Felin, Foss, & Ployhart, 2015). De resultaten uit deze studie geven namelijk een rijk en gedetailleerd inzicht in de meervoudige afhankelijkheden tussen de verschillende perspectieven van burger, politiemens en strategisch besluitvormer, welke elk een unieke rol hebben in technologie gedreven verandering binnen een publieke dienstverlener als de politieorganisatie. Dit onderzoek draagt hiermee op drie manieren bij aan de bestaande micro-foundations-literatuur die ingaat op het aanvoelen (sensing) van organisatorische kansen en risico's ten behoeve van strategische besluitvorming (Teece, 2007). Tot op heden is er een algemeen procesmodel voorgesteld. Hoofdstuk 2 voegt daar een holistische (whole-systems) methodologie aan toe, die het aanvoelen van organisatorische kansen en risico's vergroot en waarmee strategische besluitvorming verbeterd kan worden (Teece, 2007).

Als tweede laat deze studie zien hoe persuasief objectivistisch en subjectivistisch geframede argumenten zijn voor strategische besluitvormers. In deze studie is voor het eerst op een theoretisch gefundeerde manier, het tot nu toe onopgeloste debat over welke type bewijsmateriaal, statistiek of narratief, meer persuasief is voor (strategische) besluitvormers (Basel & Bruhl, 2013; Hoeken & Hustinx, 2009; Shen & Bigsby, 2013) empirisch onderzocht.

Als derde draagt deze studie bij aan het vraagstuk of studenten een valide substituut kunnen zijn voor strategische besluitvormers in onderzoek naar houding en gedrag van deze actoren. Deze studie toont aan dat studenten gebruikt kunnen worden als substituut voor strategische besluitvormers, zolang in ogenschouw genomen wordt dat ze een overschatting geven van de houding of gedrag die besluitvormers ten toon spreiden (Figuur 6.4). Hiermee is deze studie, zover bekend, de eerste die een empirisch perspectief geeft op dit vraagstuk.

Deze studie draagt ook bij aan het onderzoek naar eindgebruikersevaluatie van IT en de rol die een multi-paradigmatische aanpak kan hebben in de accumulatie van kennis in dit onderzoeksgebied. Kennis in dit onderzoekgebied wordt met name ontwikkeld binnen paradigma's, wat kennisaccumulatie van het gehele onderzoeksveld mogelijk verhindert (Cordoba et al., 2012). Over de mogelijkheid van multi-paradigmatisch onderzoek is veel gedebatteerd in de laatste 40 jaar, maar er is tegelijk weinig empirisch materiaal dat zicht geeft op de mogelijkheid van mulit-paradigmatisch onderzoek en dat de potentie in de praktijk onderzoekt. Deze studie verkent daarom empirisch wat een multi-paradigmatisch onderzoek eigenlijk kan bijdragen aan kennisuitwisseling tussen studies naar eindgebruikers van IT. De gekozen *interplay*-strategie brengt allereerst de discussie (weer) naar het empirische niveau (Schultz & Hatch, 1996). Dit maakt nu bestuderen van observeerbare overeenkomsten en verschillen mogelijk. Deze studie toont ook aan dat de huidige conceptualiseringen in

acceptatieonderzoek partieel zijn, en verrijkt kunnen worden door de dualismen in het gebruikte onderzoek bloot te leggen. Zoals uit de voorgaande conclusies blijkt is er in deze studie namelijk op meerdere manieren aangetoond dat multi-paradigmatisch onderzoek een zinvolle bijdrage levert aan de theorie die houding en gedrag van IT-eindgebruikers beschrijft en verklaart. Mogelijk kan dit inspirerend werken voor andere onderzoekers om ook multi-paradigmatisch onderzoek te gaan doen. Tenslotte geeft de in hoofdstuk 4 ontwikkelde en toegepaste mixed-methods aanpak een empirisch voorbeeld hoe verschillende methodologieën elkaar kunnen versterken, terwijl de zwaktes van beide methodologieën opgeheven worden.

In het conclusiehoofdstuk, hoofdstuk 7, worden diverse suggesties gedaan voor toekomstig onderzoek naar micro-foundations in strategische besluitvorming, multi-paradigma- en mixed-methods onderzoek. Voor de micro-foundations-beweging worden vijf suggesties gedaan. Allereerst wordt replicatie van het onderzoeksmodel geadviseerd om te zien onder welke omstandigheden dit model gevalideerd kan worden. Ten tweede wordt het uitbreiden van ons begrip van argument meta-frame gestimuleerd, bijvoorbeeld door het onderzoeken van andere paradigma's. Het ontwikkelde operationalisatieraamwerk (Tabel 6.6) kan hierbij van nut zijn. Verder lijkt de inzet van studentensteekproeven om besluitvormingsgedrag te bestuderen een betrouwbaar alternatief, wanneer toegang tot besluitvormers om een of andere reden niet mogelijk is. Hierbij dient wel opgemerkt te worden dat dit volgens het onderzoeksresultaat uit deze studie tot een overschatting van de effectgrootte kan leiden. De vierde aanbeveling stimuleert de toepassing van dual-processing-literatuur om verder uit te werken hoe heuristische verwerking (automatisch/gedachtevol) bij besluitvorming plaats vindt. Als vijfde en laatste volgt het advies om meerdere analyseniveaus toe te passen om de kennis van strategische besluitvorming verder te brengen. Denk hierbij in het bijzonder aan het verplaatsen van het analyseniveau van het individu naar de groep, want geen enkele besluitvormer is immers een eiland.

Er vanuit gaande dat er bereidheid, mogelijkheid en een klimaat aanwezig zijn om multi-paradigmatisch onderzoek uit te voeren, worden in hoofdstuk 7 meerdere suggesties voor multi-paradigmatisch onderzoek uiteengezet. Naast de in deze studie toegepaste *interplay*-strategie worden de analytische eigenschappen van de sequentiële, parallelle en overbruggingsstrategie gepresenteerd. Als laatste wordt geadviseerd om de mogelijkheden om methoden met elkaar te combineren te (blijven) verkennen. Met hoofdstuk 4 is immers empirisch aangetoond dat verschillende methoden elkaar onderling kunnen versterken. Op zoek blijven naar combinaties van bekende onderzoeksmethoden wordt niet in de laatste plaats geadviseerd om te voorkomen dat de onderzoeker zo vast zit aan een methode, dat hij of zij probeert elk vraagstuk in de methode te passen. Dit werd door Maslow ook wel het 'hamerprobleem' genoemd Maslow (1966:15): '*het lijkt immers verleidelijk om met hamer als enige gereedschap alles te behandelen alsof het een spijker is*'.

Praktische waarde

Deze studie geeft meer zicht op hoe formele en informele evaluaties van burgers en politiemensen besluitvormers kunnen beïnvloeden. Dit heeft niet alleen specifieke waarde voor de politie, maar is ook meer algemeen van waarde voor andere organisaties en professionals.

Algemene waarde voor de praktijk

De algemene waarde van deze studie voor de praktijk wordt hier per hoofdstuk uiteengezet. Hoofdstuk 2 geeft een overzicht welke factoren het succes van IT verklaren, bezien vanuit het perspectief van de eindgebruikers van IT. Dit geeft professionals in de beroepspraktijk handvatten om IT-implementaties succesvol te begeleiden. Voor ex-post-evaluatie van de impact van een IT-introductie, vanuit het perspectief van eindgebruikers van IT, worden de zogenoemde informatiesysteem (IS) succescriteria aanbevolen, zoals *IS satisfaction, intention to use* en *actual use*.

Hoofdstuk 3 geeft zicht op welke factoren acceptatie van burgers voor virtueel aangifte doen verklaren. Gezien de grote reikwijdte van aangiftes die zijn opgenomen met het virtuele aangiftesysteem uit hoofdstuk 3, is het vrij waarschijnlijk dat dit type technologie ook in andere (publieke) dienstverleningsprocessen ingezet kan worden. Uiteraard zal bij introductie van dit type virtuele technologie in een andere setting wederom een zorgvuldige afweging gemaakt moeten worden van de *bruikbaarheid* van de technologie en de mate waarin *social presence* gefaciliteerd kan worden door de virtuele technologie. Het is namelijk gebleken dat dit de twee belangrijkste voorspellers zijn van burgeracceptatie voor deze technologie. Een opmerkelijk gevolg van de bestudeerde virtuele technologie was dat door de efficiëntere inzet van met name menskracht, bij een gelijkblijvende ervaring (customer intimacy) van de burger, de politie nu ruimere openingstijden biedt tegen lagere kosten (Treacy & Wiersema, 1995).

De nieuwe combinatie van appreciative inquiry en q-methodologie, die ontwikkeld en toegepast is in hoofdstuk 4, kan dienen als een *sensing* methodologie om organisatorische kansen en risico's te identificeren vanuit verschillende stakeholderperspectieven over een te selecteren onderwerp.

In hoofdstuk 5 wordt het burgeracceptatieproces bij het doen van virtuele aangifte onder de loep genomen. Hoofdstuk 5 is niet alleen conceptueel aanvullend op het variantiemodel uit hoofdstuk 3, er vloeien ook twee aanbevelingen uit voort voor de praktijk. Allereerst wordt aanbevolen om de verschillende dimensies van *social presence* mee te nemen als evaluatiecriteria voor selectie van een virtuele technologie ter ondersteuning van (publieke) dienstverlening. Dat wil zeggen: de virtuele technologie kan worden geëvalueerd op de mate waarin de door technologie gemedieerde interactie als warm, persoonlijk en menselijk

gepercipieerd kan worden door klanten en/of burgers. Het grootste deel van de respondenten (>90%) van deze studie geeft namelijk aan dat ze op bovengenoemde criteria terugvallen bij het formuleren van hun acceptatieoordeel betreffende de virtuele technologie. Als tweede wordt aanbevolen om dienstverlenend personeel bewust te maken van het feit dat attitudes van klanten en/of burgers erg snel gevormd worden, namelijk al in het eerste contact met de technologie. Het maken van oogcontact en het geven van een warme ontvangst aan de ander zijn hiervoor prima interventies om de *social presence* van het mediërende systeem maximaal te benutten en daarmee uiteindelijk de acceptatie positief te beïnvloeden.

Als laatste toont hoofdstuk 6 aan dat evaluaties van eindgebruikers van IT beïnvloedend kunnen zijn voor strategische besluitvormers. Dit effect is het krachtigst voor zwakke argumenten gegoten in een objectivistische argumentstructuur. Deze bevindingen zijn bruikbaar voor (beleids-)adviseurs die de effectiviteit van hun communicatie naar strategische besluitvormers willen vergroten. Ook geeft het de strategische besluitvormers zelf zicht op hoe (meta-)framing van een boodschap de eigen informatieverwerking kan beïnvloeden en dus uiteindelijk ook de strategische besluitvorming die daaruit volgt.

Waarde voor de politie

Bij de start van deze studie was er bij de politie weinig kennis en vaardigheid aanwezig betreffende het gebruik van ervaringen van eindgebruikers bij besluitvormingsprocessen over IT. Dit terwijl het belang van deze informatie wel in toenemende mate door verschillende partijen werd onderkend. Reden genoeg voor de politie om een promotiestudie te faciliteren die deze vragen adresseert. Op het moment van publicatie van de studie is er, als spin-off van deze studie, een onderzoeksmethodiek ontwikkeld voor de politie die de IT-eindgebruikersevaluaties verzameld, gebruikmakend van een mixed-methods approach. Drie verschillende invalshoeken vormen samen een stelsel van technieken om IT-beleving van politiemensen te 'vangen'. Deze drie invalshoeken samen dragen de naam *Belevingsmonitor Informatievoorziening* (IV).

Allereerst is met behulp van de inzichten uit de literatuurstudie naar constructen waarmee succes van een IT voorspeld en verklaard kunnen worden (hoofdstuk 2), een panelstudie ontwikkeld waarmee de beleving van IT onder medewerkers van de politie sinds 2013 gevolgd wordt over de tijd. In het voorjaar van 2016 wordt dit onderzoek alweer voor de zesde keer uitgevoerd. Met behulp van de inzichten uit hoofdstuk 3 wordt er 2-jaarlijks een sensing-methodologie ingezet op thema's waarop de politie meer zicht wil hebben. Het in hoofdstuk 4 beschreven en toegepaste UTAUT-model is al ruim 10 keer toegepast om de impact van IT-projecten uit het omvangrijke Aanvalsprogramma Informatievoorziening op de eindgebruikersorganisatie te kunnen bepalen. Met deze studie en de Belevingsmonitor IV krijgen de eindgebruikers van IT een stem in de IT-ontwikkeling bij de politie en doen politiebesluitvormers al geruime

tijd ervaring op hoe eindgebruikersevaluaties ingebed kunnen worden in IT-besluitvorming. Daarom komen in de laatste alinea niet ik, maar de gebruikers van informatieproducten uit deze studie en haar spin-off aan het woord om een indruk te geven van de waarde van deze studie voor de politie.

De verschillende onderdelen van deze studie en de spin-off hebben op verschillende manieren toegevoegde waarde voor de politie. Allereerst omdat hiermee de IT-eindgebruikers voor het eerst in beeld komen en letterlijk een gezicht kregen (zie hoofdstuk 4). De teamchef software-ontwikkeling (Dienst ICT politie) kijkt terug op het moment dat dit onderzoek aan hem gepresenteerd werd:

> *" … we wisten voorheen niet zo duidelijk voor wie we software ontwikkelden … het heeft ons geholpen om vragen te stellen aan én te luisteren naar onze eindgebruikers in plaats van denken te weten wat onze eindgebruikers nodig hebben en op basis daarvan IT te ontwikkelen".*

Daarnaast heeft deze studie ook politiebesluitvorming geïnformeerd en direct beïnvloed rondom regionale implementatie van virtueel aangifte doen (hoofdstuk 3). Hierop terugkijkend gaf het toenmalige hoofd intake & service, politie Rotterdam-Rijnmond (nu IT-programmamanager binnen de politie) aan dat het in zijn herinnering de eerste keer was dat wetenschappelijke informatie een directe en krachtige invloed had op besluitvorming, omdat deze informatie opinies van individuele besluitvormers oversteeg. Ook de chief information officer (CIO) van de Politie gaf in een interview aan, dat informatie uit de Belevingsmonitor IV zekerheid geeft in situaties waar eerder discussie kon ontstaan. Voorheen werden gesprekken veelal gevoed door verschillende opinies van verschillende besluitvormers over hoe eindgebruikers *zouden kunnen* reageren. Met behulp van de Belevingsmonitor IV kunnen in plaats van de algehele overtuigingen van individuele besluitvormers, de IT-eindgebruikersevaluaties zelf als input dienen voor besluitvormingssituaties. Als laatste kreeg en krijg ik niet zelden terug van politiemensen dat ze dit type IT-eindgebruikersonderzoek erg waardevol vinden, zoals een rechercheur vertelde tijdens een interview:

> *"Er is eerder nooit aandacht besteed om mensen vanaf de werkvloer inspraak te geven bij de ontwikkeling, terwijl daar juist de ervaring met het systeem ligt en daar is dus de bruikbare info vandaan te halen".*

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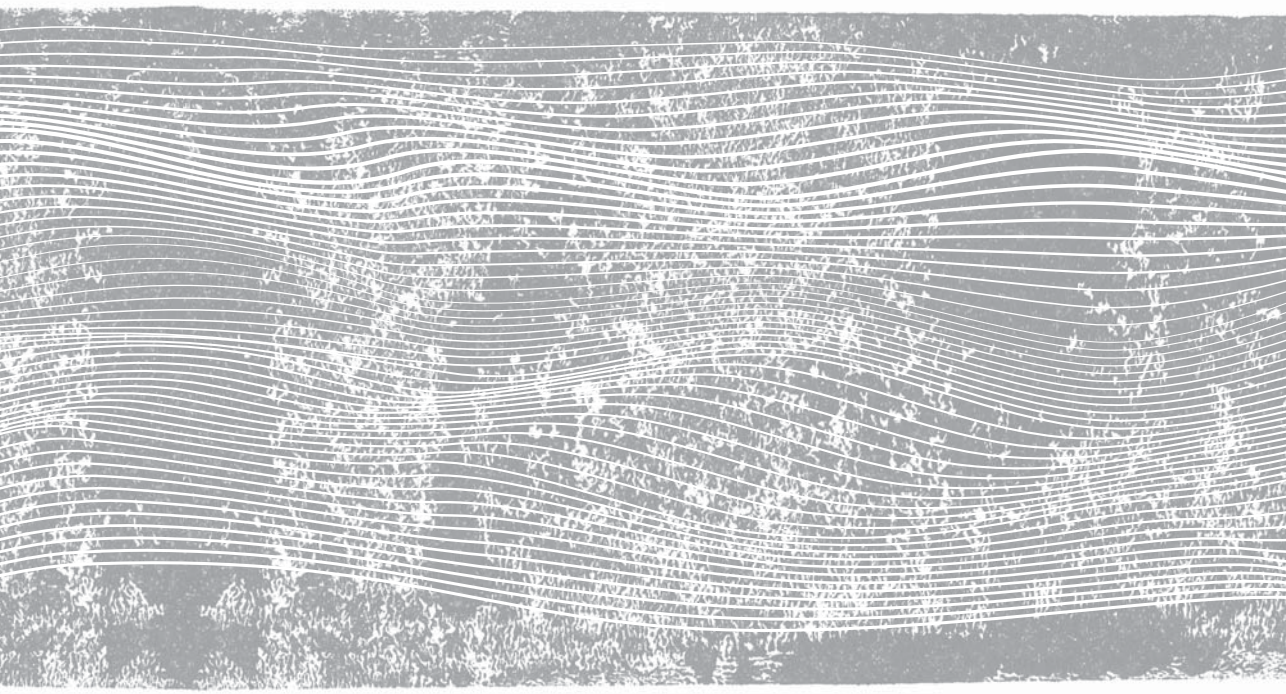
Dankwoord



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